

Asset Allocation with Alternative Investments

Alternative investments have captured the fancy of investors, both individuals and institutions. Many of these investors have become convinced that the bull market in equities experienced in the 1980s and 1990s is over, and that the secular downturn in inflation that led to unusually high bond returns is also drawing to a close. Many of those same investors have heard of the incredible returns earned by institutional investors like Yale University who have shifted from conventional stock and bond investments to alternative investments like real estate, hedge funds, and private equity. In Chapters 9-12, we have examined the chief alternative investments one by one. These investments have many attractive features as well as some important drawbacks. Now it is time to consider how well they perform in a portfolio. The first section of the chapter considers what we might term alternative investments for the ordinary investor as recommended by a leading institutional investor. The second section then introduces what we might term more exotic alternative investments, namely hedge funds, commodity futures, and private equity. The investments are evaluated in portfolios designed for high net worth and ultra high net worth investors, respectively. The third section then examines the extraordinary record of one institutional investor, the Yale University Endowment, over the period since 1985 when David Swensen took over its direction. The analysis of the Yale endowment will be designed to disentangle the effects of asset allocation from the superior access to managers provided by the Yale Endowment. The final section examines how alternative investments performed in the financial crisis.

DIVERSIFYING INTO REAL ESTATE—ALTERNATIVES FOR ORDINARY INVESTORS

In 2005 David Swensen, the director of the Yale Endowment since 1985, published a book on investment designed for the ordinary investor. The book, entitled *Unconventional Success: A Fundamental Approach to Personal Investment* presented a model portfolio for investors not wealthy enough (or perhaps too risk averse) to invest in exotic alternative investments. Swensen recommended that such investors consider two somewhat unconventional investments, real estate and Treasury inflation-protected bonds.

Let's consider the diversifying power of real estate first. As Chapter 11 explained, there are many ways to invest in real estate. Most investors own a residence, but here we are discussing investable real estate including apartment buildings, office buildings, retail office space, and factory buildings. Many wealthy investors own such real estate directly rather than through funds. For these investors, the common feature of their real estate holdings is their lack of diversification. The real estate is typically in a single area of the country and often in the same type of real estate. For example, an investor may own apartment buildings or office buildings in the Los Angeles area, but not elsewhere in the country. Or an investor may own rental real estate in a vacation area, but little else.

As explained in Chapter 11, REITS offer diversification to an investor, both geographic diversification and diversification in the types of real estate. For that reason, we will study real estate by focusing on the REIT market. The series we will use is the same one discussed in the earlier chapter, the FTSE NAREIT index of REIT equity returns provided by the National Association of Real Estate Investment Trusts. Returns from the REIT index begin in 1972. Over the period since then, REITS have earned a premium over the S&P 500 of 1.6 percent. The correlation between REITS and the S&P 500 is only 0.56. No wonder Swensen believes that real estate could help to improve the performance of a portfolio.

To see the potential for diversification into real estate, consider Figure 13-1 where two portfolios are compared. There is a stock and bond portfolio consisting of the Russell 3000 all-cap U.S. stock index, the MSCI EAFE index, and the Barclays Capital Aggregate bond index. As explained in Chapter 8 on strategic asset allocation, this three-asset portfolio provides diversification across the entire U.S. stock market, international diversification, and diversification across different types of U.S. investment grade bonds. The three asset, stock and bond portfolio is compared with a portfolio that also includes REITS. The sample period used to measure standard

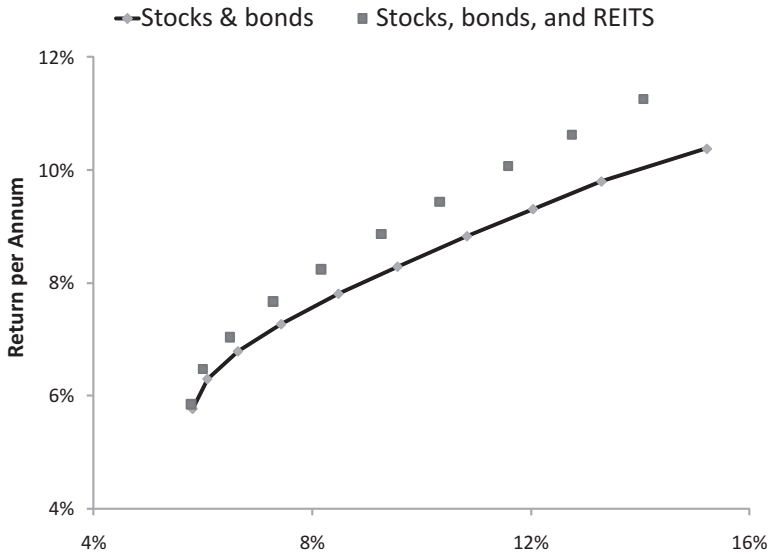


FIGURE 13-1 REITS Added to Stock and Bond Portfolios
 Sources for returns: Tables 8-3 and 13.2.

errors and correlations is 1979 to 2009 (truncated because the Russell series begins in 1979). The returns are measured through 2009 using the premium method described in Chapter 8 (and in Table 13-2 below). The addition of REITS to the portfolio shifts the frontier in a northwesterly direction. The shift is not dramatic, but it’s at no cost to the investor.

It should be noted that the optimization is done without imposing constraints on the portfolio allocation. As discussed in Chapter 8, the optimizer often chooses portfolios that might appear strange to the investor. For example, the portfolio with bonds at 30 percent of the allocation has 36.7 percent in REITS, 21.5 percent in EAFE, and only 11.8 percent in U.S. stocks. This allocation shows the diversifying power of real estate, but it is not one that most investors would choose.

For that reason, we will consider constrained portfolios. For guidance in how to constrain the portfolio, let’s consult David Swensen’s book, *Unconventional Success* (2005). The portfolio he recommends to ordinary investors is displayed in Figure 13-2. He recommends that investors diversify a conventional stock and bond portfolio by adding two assets: (a) real estate and (b) Treasury inflation-protected securities (TIPS). The latter were introduced in 1997 by the Clinton Administration, so the historical series of returns is rather short. Swensen recommends TIPS as a hedge against unexpected

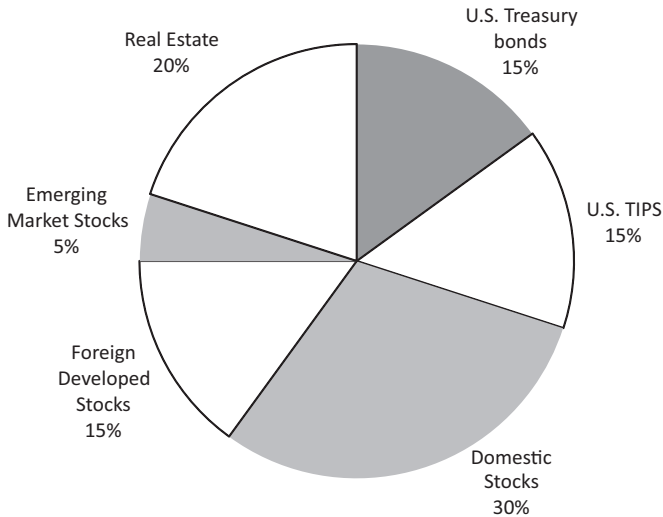


FIGURE 13-2 David Swensen's Portfolio for Individual Investors

Source: Swensen, *Unconventional Success* (2005).

inflation much like an endowment might look to commodities or timberland for such protection. Swensen allocates half of the 30 percent bond portion of the portfolio to TIPS. The other half is allocated to conventional Treasury bonds since Swensen is skeptical about the advantages of incurring credit risk by investing in non-Treasury bonds. Swensen also allocates 20 percent of the portfolio to real estate. This is truly an unconventional portfolio. But given Swensen's extraordinary success in investing Yale's endowment, his views ought to be considered seriously.

To evaluate the Swensen portfolio, we again employ the premium method for estimating returns. As explained in Chapter 8 on asset allocation, the premium method builds on the fundamental capital market assets, U.S. Treasury bonds and the S&P 500. Those returns were estimated to be 4.9 percent and 9.4 percent, respectively.¹ Since REITS earned a premium over the S&P 500 of 1.6 percent from 1972 to 2009, the REIT return is estimated to be 11.2 percent.² TIPS were introduced in 1997, so the data set extends only from March 1997 through December 2009. Over this period, TIPS earned a 0.5 percent premium over the medium-term Treasury bond, so the TIPS return is estimated to be 5.4 percent. As an alternative to the portfolio recommended by Swensen, a conventional portfolio is chosen with ordinary Treasury bonds replacing the TIPS allocation and stocks replacing the REIT allocation (with the foreign/domestic proportions for equities

TABLE 13-1 Comparison between Swensen’s *Unconventional Success* Portfolio and Conventional Portfolio

Portfolio Shares	Unconventional Success Portfolios		Conventional Portfolio
	With Real Estate and TIPS	With no TIPS	
U.S. Treasury Bonds (SBBI MT)	15%	30%	30%
U.S. TIPS (Barclays TIPS)	15%		
Domestic Equity (Russell 3000)	30%	30%	42%
Foreign Developed Equity (EAFE)	15%	15%	21%
Emerging Market Equity (MSCI EM)	5%	5%	7%
Real Estate (FTSE NAREIT)	20%	20%	
Average Return	9.3%	9.3%	9.0%
Standard Deviation	10.5%	10.3%	10.5%
Sharpe Ratio	0.56	0.57	0.53
Alpha*	0.3%	0.4%	

The *Unconventional Success* portfolio refers to the portfolio recommended for ordinary investors by David Swensen (2005). Expected returns are from Tables 8-3 and 13.2. Standard deviations are calculated using Zephyr AllocationADVISOR for sample period from 1990 to 2009 except for the TIPS series which begins in March 1997.

Data Sources: ©Morningstar, Barclays Capital, Russell®, MSCI, and ©FTSE.

remaining the same). The two portfolios were evaluated using Zephyr AllocationADVISOR. The standard deviations and correlation coefficients for both portfolios were based on the same sample period beginning in 1990 (when the MSCI Emerging Markets Index begins) except that the TIPS returns begin only in March 1997.³

The results of this comparison are reported in Table 13-1. Swensen’s recommended portfolio with REITS and TIPS earned 0.3 percent more than the conventional portfolio (9.3 percent versus 9.0 percent). Since the standard deviations of the two portfolios are identical, the Sharpe ratio of Swensen’s recommended portfolio is higher than that of the conventional portfolio, 0.56 versus 0.53. That translates into an excess return, or alpha*, of 0.3 percent for Swensen’s portfolio.⁴ That’s certainly not much of an improvement in performance, but it’s achieved while staying with quite conventional alternative investments. Swensen designed the portfolio for the ordinary investor, and there is nothing about this portfolio that should alarm such an investor.

How much of that outperformance is due to the addition of real estate and how much to the addition of TIPS? The answer is provided in Table 13-1 in the middle column of the table where the allocation to TIPS is replaced by conventional Treasury securities. The portfolio without TIPS actually performs a little better than Swensen's recommended portfolio. The modified Swensen portfolio outperforms the conventional portfolio by 0.4 percent in risk-adjusted terms. So it's the real estate investment that delivers the improvement in performance in Swensen's portfolio. A 20 percent allocation to real estate gives the investor an extra boost in terms of risk-adjusted returns.

The statistics in Table 13-1 may not do true justice to Swensen's argument for diversification into TIPS. The main reason that Swensen adds TIPS to a conventional portfolio is to guard against unexpected inflation. In an endowment portfolio like Yale's there are several types of investments, like timberland and oil and gas properties, that will help protect the portfolio against inflation. The value of these assets is never fully appreciated unless inflation rises unexpectedly. Since 1997 when TIPS were introduced, it's been deflation rather than inflation that has preoccupied many minds.

Swensen's portfolio suggests that there are advantages to diversifying the portfolio beyond conventional stocks and bonds. Institutional investors as well as high net worth investors, however, often consider alternative investments more exotic than those in this portfolio designed by Swensen for ordinary investors. The next section of this chapter will consider how investments like hedge funds, commodities, and private equity can help to diversify the portfolio. Then in the following section, the Yale endowment portfolio will be analyzed. Yale's portfolio combines many of these alternative investments in a very unconventional way.

EXPANDING THE MENU OF ALTERNATIVE ASSETS

In earlier chapters, several different types of alternative investments were discussed in detail, among them hedge funds, commodities, and private equity, along with real estate. This section will analyze how these alternative assets help to diversify the portfolio. Several portfolios containing conventional and alternative assets will be examined.

In addition to the FTSE NAREIT index discussed in the last section, the indexes chosen are as follows:

Hedge funds: the HFRI Fund of Funds Index and Credit Suisse/Tremont Hedge Fund Index. The HFRI index begins in 1990 while the Credit Suisse/Tremont index begins in 1994.⁵

Commodity futures: the Dow Jones UBS Commodity Index. As discussed in Chapter 12, this index limits the weight of any individual

commodity to 33 percent of the index, so it is a more representative index than the Goldman Sachs Commodity Index (which is dominated by energy). The DJ UBS index begins in February 1991.

Venture capital: the Cambridge Associates LLC U.S. Venture Capital Index[®]. This index begins in the second quarter of 1981.

Private equity: the Cambridge Associates LLC U.S. Private Equity Index[®]. This index, which begins in the second quarter of 1986, consists primarily of buyout funds.

It should be noted that some of these indexes for alternative investments are quite different from the stock and bond indexes used in a conventional indexed portfolio. First, unlike the DJ AIG commodity futures index, which measures the returns on a passive investment in commodity futures contracts, the indexes for REITs, hedge funds, and private equity all measure the performance of *active managers*. For example, the FTSE NAREIT real estate index measures the returns of REIT managers who actively manage portfolios of real estate assets. Similarly, hedge fund and private equity managers actively manage their portfolios of assets, so indexes for hedge funds and private equity measure some average of the managers' performance. Second, some of these indexes, notably the hedge fund indexes, have *significant biases* in measuring the set of active managers. So they should be regarded as asset benchmarks rather than genuine indexes.

To obtain measures of the expected returns on these alternative investments, we use the premium method introduced in Chapter 8. Table 13-2 reports the premiums for these alternative assets. The table reports the index used for each alternative asset, the premium over the S&P 500, the period of measurement, and the resulting estimated return. For example, as discussed in the first section of this chapter, the FTSE NAREIT Index of REITs has a premium of 1.6 percent above the S&P 500 over the period starting in 1972 (when the FTSE NAREIT series begins). If the expected return on the S&P 500 in the long run is 9.4 percent, this results in an expected return on the REIT index of 11.2 percent. In contrast, the Dow Jones AIG Index of commodity futures returns has a negative premium of -2.5 percent over the period from February 1991 to December 2009. So the estimated return is 6.7 percent.⁶

Portfolios containing alternative investments will be compared with a conventional portfolio of stocks and bonds. The conventional portfolio to be used as a benchmark in all of the comparisons consists of the same four indexes used in earlier experiments: the Barclays Capital Aggregate index of investable U.S. bonds, the Russell 3000 all-cap U.S. stock index, the MSCI EAFE Index of foreign developed country stocks, and the MSCI Emerging Market Index. The benchmark portfolio consists of 25 percent in bonds

TABLE 13-2 Premiums of Alternative Investment Returns over S&P 500

Alternative Asset Index	Premium over S&P 500	Estimated Return	Period of Measurement
FTSE NAREIT	+1.6%	11.2%	1972–2009
HRFI Fund of Funds	+0.0%	9.4%	1990–2009
Credit Suisse/Tremont Hedge Fund	+1.6%	11.2%	1994–2009
DJ UBS Commodity	–2.5%	6.7%	Feb 1991–Dec 2009
Venture Capital	+2.1%	11.7%	1981 Q2–2009 Q3
Private Equity	+3.4%	13.1%	1986 Q2–2009 Q3

The alternative indexes are the FTSE NAREIT Index for REITS, the HFRI Fund of Funds and Credit Suisse/Tremont Hedge Fund indexes, the Dow Jones UBS commodity futures index, and the Cambridge Associates LLC U.S. indexes for venture capital and private equity. The premiums are measured relative to the S&P 500 over the periods indicated and applied to the long-run S&P 500 (geometric average) estimated return of 9.4 percent.

Data Sources: S&P, ©FTSE, HFRI, Credit Suisse/Tremont, Dow-Jones-UBS Commodity Indexes©, Cambridge Associates LLC U.S. Venture Capital Index® and U.S. Private Equity Index®.

and 75 percent in stocks. Forty percent of the stocks (or 30 percent of the portfolio) is invested overseas with one-third of the foreign stocks invested in emerging markets. This portfolio is illustrated on the left side of Figure 13-3. When alternative assets are added to the portfolio, domestic and foreign stocks remain in the same proportion as in the benchmark portfolio.

HIGH NET WORTH (HNW) PORTFOLIOS

Several portfolios with alternative investments are examined. The first two portfolios are designed for high net worth investors who are willing to invest in hedge funds and commodity futures as well as in real estate, stocks, and bonds. Both HNW portfolios have 25 percent invested in bonds, 50 percent in stocks, and 25 percent in alternative investments (including real estate). The first of these portfolios has 10 percent in hedge funds, 5 percent in commodity futures, and 10 percent in REITS. This portfolio is illustrated on the right side of Figure 13-3. The second HNW portfolio excludes commodity futures with the REIT allocation increased to 15 percent from 10 percent. The other portfolios are designed for ultra-high net worth investors who can cope with the illiquidity of venture capital and private equity investments. These portfolios will be discussed below.

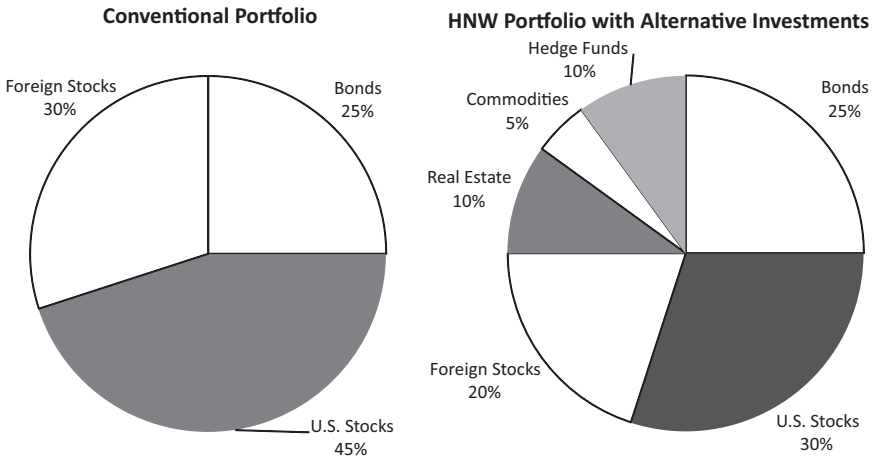


FIGURE 13-3 Conventional Portfolio with Traditional Investments and HNW Portfolio with Alternative Investments

The two HNW portfolios are examined in Table 13-3. The hedge fund index used for these portfolios is the HFRI Fund of Funds index since high net worth investors usually cannot diversify manager risk adequately by investing directly in hedge funds.⁷ The expected returns of each portfolio are calculated using Zephyr AllocationADVISOR, but only after the individual asset returns are replaced by the estimated returns obtained using the premium method (as in Table 13-2).⁸ The standard deviations and correlations for each portfolio are measured by Zephyr from February 1991 (when the DJ UBS index begins) until December 2009.

Consider the first HNW portfolio that includes 10 percent in hedge funds, 5 percent in commodities, and 10 percent in REITS. This portfolio is shown in the second column of Table 13-3. The addition of three alternative investments—real estate, hedge funds, and commodities—lowers risk by 1.8 percent while lowering the average return by 0.2 percent. The Sharpe ratio for this HNW portfolio is 0.59 compared with the Sharpe ratio of 0.52 for the conventional portfolio measured over the same period. In Figure 13-4, this portfolio is compared with the conventional portfolio. After adjusting the risk of the conventional portfolio down to that of the HNW portfolio, the return on the latter exceeds that of the conventional portfolio by 0.7 percent. So the shift of 25 percent of the portfolio from stocks to the three alternative assets raises the risk-adjusted return 70 basis points.

Table 13-3 also shows the performance of a second HNW portfolio that replaces the 5 percent allocation to commodity futures with an additional 5 percent in REITS. So this portfolio has 10 percent in hedge funds and

TABLE 13-3 Comparison between HNW Portfolios (with Alternatives Investments) and Conventional Portfolio (no Alternatives)

Portfolio Shares	HNW Portfolios		Conventional Portfolio
	With Commodities	Without Commodities	
Barclays Aggregate	25%	25%	25%
Russell 3000	30%	30%	45%
MSCI EAFE	13.3%	13.3%	20%
MSCI Emerging Markets	6.7%	6.7%	10%
FTSE NAREIT	10%	15%	
HFRI Fund of Funds	10%	10%	
DJ UBS Commodity Index	5%		
Average Return	9.2%	9.5%	9.4%
Standard Deviation	9.7%	10.1%	11.5%
Sharpe Ratio	0.59	0.59	0.52
Alpha*	0.7%	0.7%	

The returns for individual assets are based on the premium method as reported in Tables 13.2 and 8-3. Standard deviations are measured starting in February 1991.

Data Sources: Barclays Capital, Russell[®], MSCI, ©FTSE, HFRI, Dow-Jones-UBS Commodity Indexes©.

15 percent in REITS. The results are very similar to those for the first HNW portfolio. This portfolio has a higher return than the first HNW portfolio because REITS have earned a higher return than commodities, but the Sharpe ratios of the two HNW portfolios are identical.

So does a HNW investor with access to alternative investments do much better than an ordinary investor confined to conventional assets? The answer is provided by the alpha* calculations. Yes, the HNW investor does earn an extra 0.7 percent adjusted for risk. It should be noted, though, that an excess return of that size could easily be swamped by excessive investment expenses or taxes, or other sources of investment expense. And remember that the hedge fund returns are upwardly biased. So the alpha* calculation may overstate the actual advantage of the alternative strategy.

ULTRA HNW PORTFOLIOS

Ultra HNW investors are in a somewhat different investment world than the rest of us. Those investors are able to tie up capital for extended periods of time, so the world of venture capital and private equity is open to them.

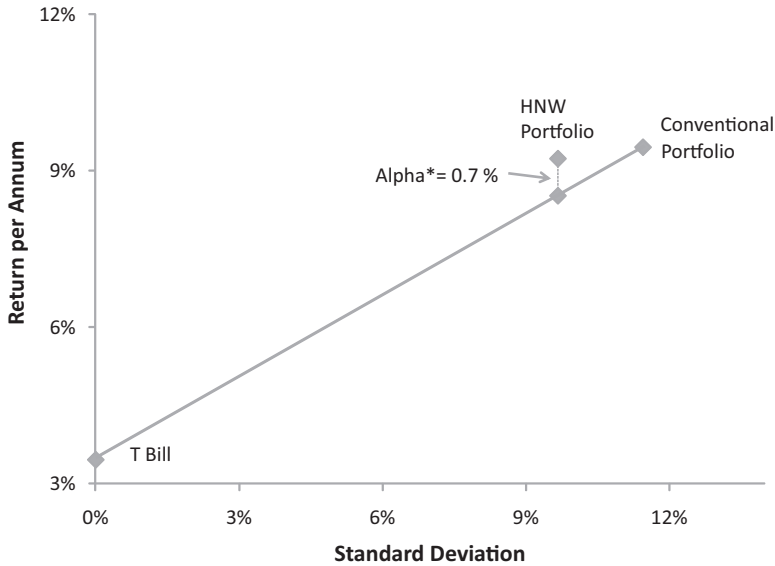


FIGURE 13-4 HNW Portfolio Compared with Portfolio Without Alternative Investments

Data Sources: Barclays Capital, Russell®, MSCI, ©FTSE, HFRI, Dow-Jones-UBS Commodity Indexes©.

At what wealth level do such investments become possible? Some brokerage firms define ultra HNW investors as having as little as \$20 million or \$30 million in wealth.⁹ But it’s not clear that an investor with \$20 or \$30 million could afford to tie up 10 percent of the portfolio in an investment that would be illiquid for 10 years or more. Certainly such an investor could not obtain much diversification within the private equity portion of the portfolio, since the minimums for investment in venture capital or buyouts would preclude more than one or two investments (if the total amount to be invested was \$2 or \$3 million). In any case, our definition of the ultra HNW investor will be made in terms of eligible investments rather than in terms of wealth. *An ultra HNW investor is any investor who can devote 10 percent or more of the portfolio to private equity or other illiquid investments.* This definition is useful because we are primarily interested in portfolio performance rather than levels of wealth per se.

Since many ultra-HNW investors can obtain sufficient diversification of hedge fund investments by directly investing in hedge funds, the Credit Suisse/Tremont Hedge Fund index will be used to measure hedge fund performance rather than the HFRI Fund of Funds index. The Tremont index begins in 1994, so standard deviations and correlations will be measured

over the period from 1994 through the third quarter of 2009. To measure private equity returns, the two Cambridge Associates series described in Chapter 10 are used. These series are for venture capital and private equity.¹⁰ The portfolios described below will allocate equal proportions to each type of investment. The CA series are available only quarterly, so the correlations and standard deviations had to be loaded manually into the Zephyr program (since all other series are available monthly). As discussed in Chapter 10, the volatility of these investments is probably seriously underestimated because the returns are smoothed by infrequent valuations. So the standard deviations of the resulting portfolios are downwardly biased. The measured correlations are also probably lower than in reality.

Table 13-4 compares portfolios for the ultra HNW investor with the conventional portfolio previously described. The table examines two ultra HNW portfolios. In the second column, Portfolio A assigns 25 percent to alternative investments overall with 5 percent allocated to venture capital and another 5 percent to private equity. In the third column, Portfolio B doubles the allocation to alternatives to 50 percent of the portfolio.

TABLE 13-4 Comparison between Portfolios for Ultra-HNW Investors and Conventional Portfolio

Portfolio Shares	Ultra-HNW Portfolios		Conventional Portfolio
	Portfolio A	Portfolio B	
Barclays Aggregate	25%	25%	25%
Russell 3000	30%	15%	45%
MSCI EAFE	13.3%	6.7%	20%
MSCI Emerging Markets	6.7%	3.3%	10%
FTSE NAREIT	5%	10%	
Credit Suisse/Tremont Hedge Fund	10%	20%	
Venture Capital	5%	10%	
Private Equity	5%	10%	
Average Return	9.7%	10.0%	9.4%
Standard Deviation	10.4%	9.4%	11.8%
Sharpe Ratio	0.60	0.70	0.50
Alpha*	1.0%	1.9%	

The returns for individual assets are based on the premium method as reported in Tables 13.2 and 8-3. Standard deviations are measured from 1994 to 2009 Q3.

Data Sources: Barclays Capital, Russell[®], MSCI, ©FTSE, Credit Suisse/Tremont, Cambridge Associates LLC U.S. Venture Capital Index[®] and Private Equity Index[®].

Consider first Portfolio A with 25 percent invested in alternatives. The return on this portfolio is 0.3 percent higher than that of the conventional portfolio and the standard deviation is 1.4 percent lower. So the Sharpe ratio of the ultra HNW portfolio is higher. Translated into an excess return, this higher Sharpe ratio results in an alpha* of 1.0 percent. That's a little higher than achieved by the HNW investor who is confined to real estate and hedge funds. But the addition of venture capital and private equity to the portfolio does not matter that much.

Portfolio B doubles the allocation to alternative investments to 50 percent of the portfolio. That has the predictable effect of increasing the relative performance of the ultra HNW portfolio. The return of Portfolio B is 0.6 percent above that of the conventional portfolio while the risk is 2.4 percent lower. The Sharpe ratio is high enough to result in an alpha* of 1.9 percent relative to that of the conventional portfolio. These results in Table 13-4 are notable, but they are not as impressive as we might expect. Remember that these returns are obtained only after tying up part of the portfolio in very illiquid investments. Surely an extra 0.3 percent return (comparing the alpha* of 1.0 percent for Portfolio A with the alpha* of 0.7 percent for the HNW portfolio in Table 13-3) is not much compensation for investing 10 percent of the portfolio in illiquid VC and PE investments.

The results developed in this section must puzzle some readers. It's well known that some wealthy institutions have made huge returns by investing in alternative investments. The Yale Endowment is perhaps the best example, but other institutions such as Harvard University and the Rockefeller Foundation have also achieved superior returns by investing in alternatives. How we reconcile their results with those analyzed above is the subject of the next section of this chapter.

LESSONS ABOUT ALTERNATIVES FROM THE YALE ENDOWMENT

Interest in alternative investments has been enhanced dramatically by the remarkable performance of the Yale Endowment under its long-term director, David Swensen. Since he took over direction of the Endowment in 1985, the Endowment has compiled one of the most impressive records of any investment organization. As will be shown in this section, Yale beats all normal benchmarks including those of peer institutions. What is more impressive perhaps is that it has led the way in revolutionizing the investment practices of educational institutions nationwide. Under David Swensen, Yale has embraced alternative investments and they have been the key to its

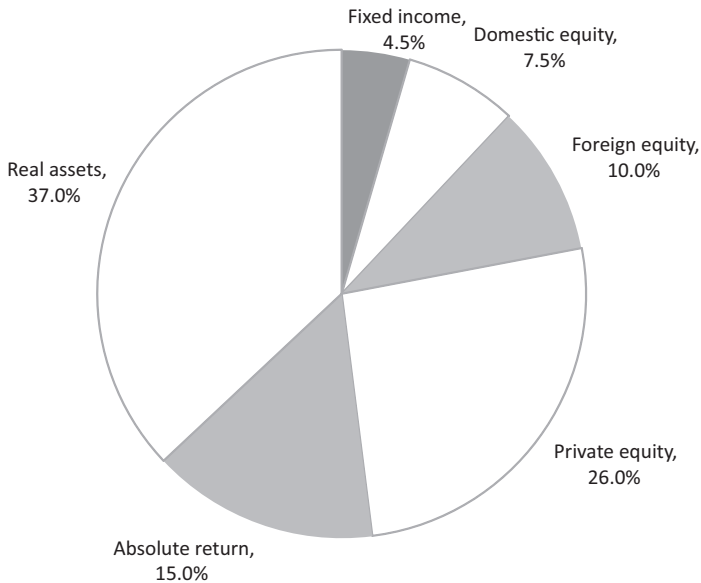


FIGURE 13-5 Target Portfolio of Yale Endowment, 2009

Sources: 2009, The Yale Endowment.

success. Whether other investors should emulate Yale is a question that will be addressed in this section.

Consider the strategic asset allocation reported in the 2009 Yale Endowment report as illustrated in Figure 13-5. Only 22 percent of the portfolio is in traditional stock and bond investments. It's interesting that Yale has more invested in foreign equity (10 percent) than in U.S. equity (7.5 percent). All of the rest of the portfolio is in three alternative asset classes:

Private equity (26 percent of portfolio), primarily in *venture capital* and *buyouts*

Absolute return (15 percent), split between *event-driven strategies* (tied to mergers, bankruptcy restructurings, or other corporate events) and *value-driven strategies*

Real assets (37 percent), primarily *real estate, oil and gas properties, and timberland*

A small investment staff led by Swensen and Dean Takahashi, Swensen's deputy, chooses the management firms that in turn invest in all of these alternative asset classes.

With such a large allocation to alternative investments, the Yale endowment has lowered risk to much lower levels than would normally be associated with a portfolio allocation with so little in fixed income.¹¹ In fact, over the period from 1986 to 2009, a period that covers Swensen’s tenure to date at Yale, the standard deviation of the portfolio has been only 13.3 percent compared with a standard deviation for the Russell 3000 of 16.3 percent. The fact that Yale has averaged a return of 14.2 percent is quite impressive given that the Russell 3000 return was only 9.2 percent over the same period and the S&P 500 return only 9.3 percent.¹² Lower risk and much higher returns—that’s an impressive record. Adjusting the Russell 3000 (all-equity) return down to the risk level of the Yale endowment, the excess return of that endowment is an impressive 5.7 percent per annum. In other words, Yale has outperformed the U.S. stock market *adjusted for risk* by almost 6 percent per year on average since 1986.

In 1986 when Swensen took over the portfolio, Yale invested only 3.2 percent in private equity, 8.5 percent in real assets (mostly real estate) and nothing in absolute return assets.¹³ Between 1985 and 2009, the Yale Endowment increased its commitment to alternative investments from 11.7 percent of the portfolio to 78 percent. Figure 13-6 compares Yale’s

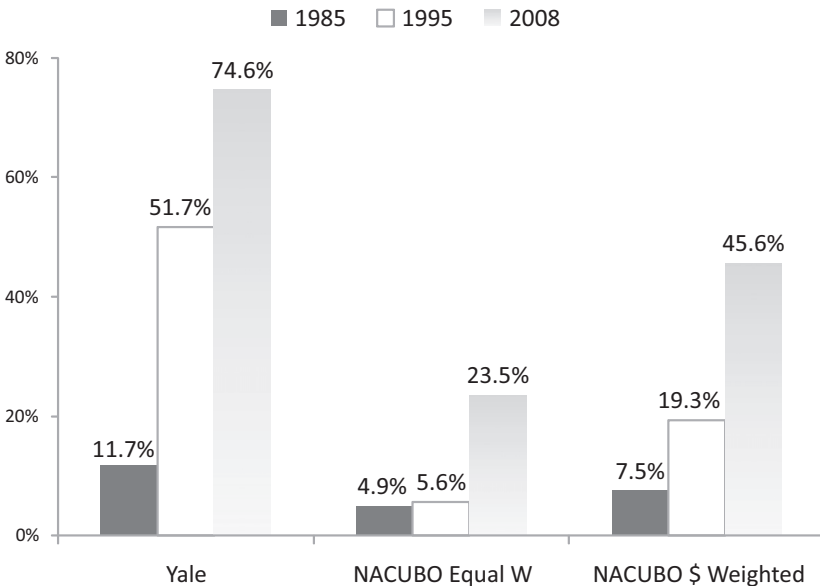


FIGURE 13-6 Allocation to Alternative Investments: Yale Endowment and University Endowments (NACUBO Survey)

Sources: Yale Endowment (various reports) and NACUBO.

allocation to alternatives with those of other university endowments as reported by NACUBO, the National Association of College and University Business Officers. Each year NACUBO conducts a survey of its members to determine the asset allocations that their endowments are following. NACUBO reports two sets of figures, those that equally weight all colleges and universities and a dollar-weighted average. The massive size of the endowments of the richest institutions ensures that the dollar-weighted average is heavily influenced by the asset allocation decisions of the biggest endowments. In 2008, the top 10 institutions had 36 percent of the endowment monies of the 791 institutions in the survey. The dollar-weighted average, therefore, better reflects the asset allocations of Yale's peers.

Figure 13-6 shows the asset allocations over more than three decades. In 1985 when Swensen took over the Yale Endowment, Yale's allocation to alternatives was still only 11.7 percent compared with NACUBO's equal-weighted average of 4.9 percent.¹⁴ By 2008, NACUBO's average allocation to alternatives had increased to 23.5 percent while Yale's had risen to 74.6 percent. Interestingly enough, the NACUBO dollar-weighted average allocation had increased from 7.5 percent in 1985 to 45.6 percent in 2008. So Yale's shift toward alternatives is part of a larger trend in the endowments of many universities.¹⁵

To what extent is the shift toward alternatives by Yale part of a larger shift by all institutional investors? Some evidence about this issue is provided by the 2009 Greenwich Associate survey of pension plans, endowments and foundations. The average asset allocation of the institutions in this survey is given in Figure 13-7.¹⁶ These institutions devoted only 14.8 percent of their portfolios to alternative investments (defined to include real estate, private equity, and hedge funds). So there is a large gap between the allocations to alternatives by Yale and its peers on the one hand, and non-educational institutions on the other hand.

Investments in hedge funds provide the biggest contrast between university endowments and the other institutional investors studied in the Greenwich surveys. In 1999, the Greenwich survey did not even have a category for hedge funds. Between 2001 (when hedge funds were first reported) and 2009, average allocations to hedge funds increased from 0.6 percent to 4.0 percent. That's a large percentage increase in hedge funds, but the 4 percent allocation in 2009 is very small relative to the 15 percent strategic allocation of the Yale Endowment or the 12.9 percent allocation of the average university endowment.¹⁷ So the institutional investor world has started to embrace hedge funds, but the university endowments have gone on to full courtship.

Yale's push into alternative investments has evidently been a key reason for its investment success. One way to see how well the Yale endowment has performed is to compare it with the conventional portfolio discussed

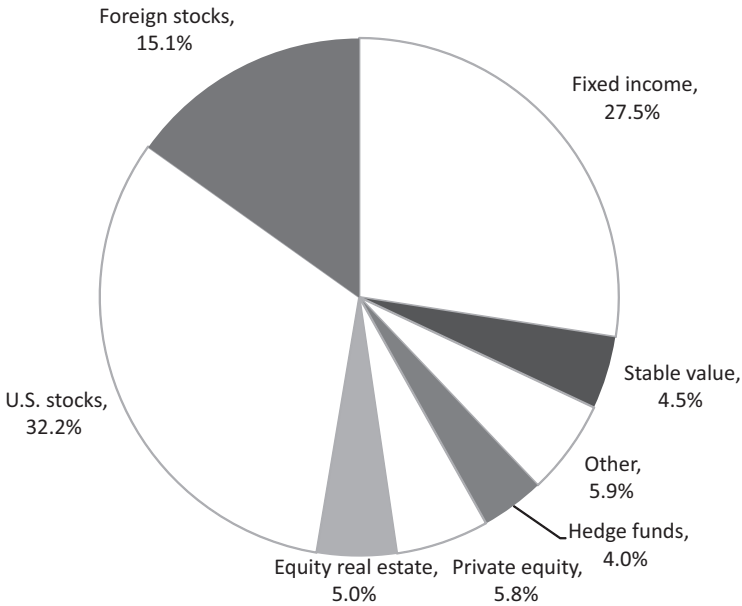


FIGURE 13-7 Investments of Pension Plans, Endowments and Foundations
Source: Greenwich Investment Report, 2009.

earlier that is made up of traditional stock and bond investments. This is the portfolio shown on the left side of Figure 13-3. Figure 13-8 compares the Yale and conventional portfolios for the period since Swensen's tenure began. Since the conventional portfolio has a slightly higher risk standard deviation than the Yale portfolio (13.5 percent versus 13.3 percent), its risk is reduced to that of the Yale portfolio in order to make a proper comparison. The alpha* of the Yale portfolio relative to this benchmark portfolio is an impressive 4.3 percent.

It's important to try to disentangle the sources of Yale's success. Is the extraordinary return due to Yale's devotion to alternative investments? Or is it due to Yale's selection of (and access to) superior managers? We can try to extract an answer to these questions by constructing an experiment. Let's set up a portfolio with the same asset allocation that Yale followed each year over the period from 1986 to 2009, but with each asset invested in an index rather than in the managers that Yale selected. As previously noted, the indexed portfolio will reflect active management in some of the alternative asset classes such as hedge funds, venture capital, and private equity. So the returns on what we call the indexed portfolio will reflect the asset allocation chosen by Yale together with the performance of the average fund managers in the alternative investment indexes. And recall that

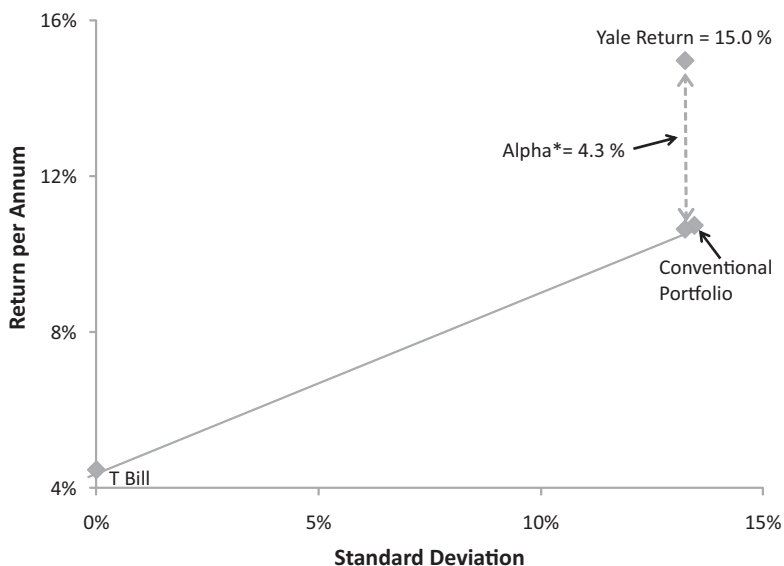


FIGURE 13-8 Alpha* of Yale Endowment Returns Relative to Conventional Portfolio, 1985–2009

Sources: Yale Endowment (various reports), ©Morningstar, Russell® and MSCI.

some of these alternative investment indexes, particularly those for hedge funds, are upwardly biased. Comparing the return on this indexed portfolio with Yale's actual return gives us a measure of how much value added has come from Yale's manager selection and access to superior managers. This is an important issue because ordinary investors may not have the same access to managers that Yale does and because ordinary investors may not have the resources to find the best managers in the first place. But because of the biases in the indexes used, we will *underestimate the value added provided by Yale's superior manager selection and manager access*.

To apply this methodology, we must identify an index or indexes for each asset class. For some alternative asset classes, this is a difficult task since the range of alternatives chosen by Yale is difficult to capture in indexes. The following is a list of indexes chosen to represent each asset class:¹⁸

Cash: one month Treasury bill return from SBBI

Bonds: medium-term Treasury bond from SBBI (since Yale's bond portfolio is made up primarily of Treasuries)

- Domestic equity: Russell 3000 all-cap stock index
- Foreign equity: MSCI EAFE and MSCI Emerging Market indexes (with two thirds weight on MSCI EAFE)
- Private equity: Cambridge Associates indexes for private equity and venture capital (one half weight for each)¹⁹
- Absolute return: HFRI fund-weighted composite hedge fund index through 1993 and Credit Suisse/Tremont thereafter²⁰
- Real assets: NCREIF institutional real estate index and Goldman Sachs Commodity Futures Index (one half weight to each)

The real asset category in Yale's portfolio consists mainly of real estate, timberland, and oil and gas properties. For real estate, the NCREIF institutional real estate index is used instead of the FTSE NAREIT index because Yale uses it as its real estate benchmark. Since there are no good indexes for timberland and oil and gas properties, the GS commodity futures index, with its heavy weight on energy, is used instead.²¹

If Yale had invested in all of these indexes during Swensen's tenure, the endowment would have earned a return of 13.0 percent with a standard deviation of 13.4 percent (compared with Yale's 13.3 percent). An alpha* calculation can compare the relative returns on a risk-adjusted basis. Figure 13-9 shows the calculation. If an investor chose the Yale allocation each year, but invested in indexes, that investor would have earned *on a risk-adjusted basis* 2.3 percent more than an investment in the benchmark (traditional) portfolio. Yale's choice of managers then added *an extra 2.0 percent* to its performance. So *Yale's performance was based on its manager selection and access as well as on its reliance on alternative investments*. That's exactly what David Swensen told investors in his book *Unconventional Success* (2005). It's important to reiterate that the return calculated using indexes is probably upwardly biased because some of the indexes for alternative investments, particularly the hedge fund indexes, are upwardly biased. So the estimate of what Yale earned due to manager selection and access is probably larger than indicated above. It's impressive enough as it is.

If Yale has led the charge into alternative investments, how well has it done relative to other universities? In Table 13-5, the returns of the Yale Endowment are compared with the average returns reported in the NACUBO studies. Over the period from 1986 to 2009, Yale has achieved a compound return of 14.2 percent compared with a return of 8.8 percent for the NACUBO equal-weighted return.²² The NACUBO returns have less risk than Yale's, so it's important to compare the returns adjusted for risk. The Sharpe ratio for the Yale endowment is 0.79 compared with a Sharpe ratio

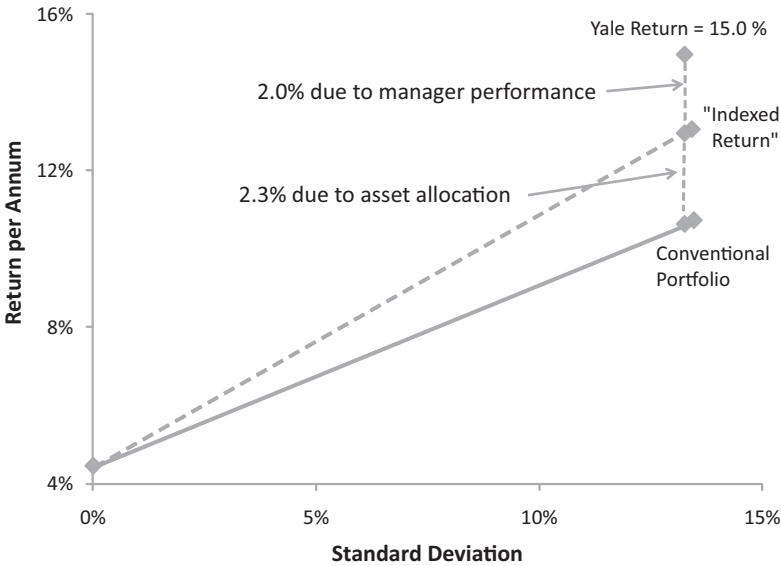


FIGURE 13-9 Alpha* of Yale Endowment Returns Relative to Indexed Portfolio and Conventional Portfolio

Sources: Yale Endowment (various reports) ©Morningstar, Russell®, MSCI, NCREIF, S&P, Cambridge Associates LLC U.S. Venture Capital Index® and Private Equity Index®, HFRI, and Credit Suisse/Tremont.

for NACUBO index of 0.48. The risk-adjusted excess return, or alpha*, for the Yale endowment is an impressive 4.2 percent per annum. This excess return implies that Yale’s endowment has delivered a cumulative excess return over the 24-year period more than 160 percent. Not bad for a handful of staff in a New Haven office far from Wall Street!

TABLE 13-5 Performance of Yale Endowment Compared with University Endowments, 1986–2009

	Geometric Average	Arithmetic Average	Standard Deviation	Sharpe Ratio	Alpha*
Yale Endowment	14.2%	15.0%	13.3%	0.79	4.2%
NACUBO	8.8%	9.2%	10.0%	0.48	

Sources: Yale Endowment (various reports) and NACUBO.

LESSONS ABOUT ALTERNATIVE INVESTMENTS LEARNED IN THE FINANCIAL CRISIS

Yale and other institutional investors suffered along with the rest of us when the financial crisis hit in 2007 to 2009. Yale's portfolio suffered a loss of 24.6 percent in the fiscal year 2009 (from July 2008 to June 2009). Harvard's portfolio was down 27.3 percent. The average return of NACUBO members was -18.7 percent. How do we explain these results? This section will examine how different types of alternatives fared during the crisis. Then it will examine Yale's performance.

One important feature of investments during the crisis was that they varied widely in how accurately they reflected true economic values. Stocks are priced on organized exchanges—marked to market at every point in time. The same is true of REITS and the commodity futures contracts measured by the GSCI or DJ UBS commodity indexes. The same cannot be said of private equity or the NCREIF valuation-based index of real estate returns.

Consider first the damage inflicted on publicly traded equities during the crisis. The S&P 500 index reached a peak for this cycle on October 9, 2007. For the next 17 months it fell 56.8 percent until reaching a trough on March 9, 2009. Using monthly data for total returns on the S&P 500 (including dividends), the cumulative return on the S&P 500 was -46.7 percent from October 2007 through March 2009. Over the same 17 months, the return on the EAFE index was -53.6 percent and the return on the MSCI Emerging Markets index was -55.9 percent.

Over the same period, private equity suffered, but their returns were far better than those of public equity. Table 13-6 compares returns on the S&P 500 with those on venture capital and private equity from Cambridge Associates. In contrast to the -46.7 percent return on the S&P 500, venture capital returned -15.6 percent and private equity -22.6 percent. Recall from Chapter 10 that the returns on VC and PE are based on valuations, which often reflect stale prices for the projects being evaluated. During the crisis, these valuations must have lagged far behind the public equity's pricing of similar companies. After all, private equity firms are trying to prepare their investments for eventual sale to the public equity markets. When the latter are down more than 40 percent, how can the private equity valuations be down less than half as much?²³

A similar pattern is seen in real estate returns. Over this same period, the FTSE NAREIT return on publicly traded REITS was down 63.4 percent. But the NCREIF index reflecting the real estate holdings of institutional investors was down only 10.5 percent. Surely there cannot be that large a difference in the commercial real estate properties held in REITS on the one hand, and those held in institutional portfolios on the other hand. As explained

TABLE 13-6 Returns on Stocks and Alternative Investments during Financial Crisis

Index	October 2007–March 2009*	Fiscal 2009**
S&P 500	−46.7%	−26.2%
Venture Capital	−15.6%	−17.3%
Private Equity	−22.6%	−22.0%
FTSE NAREIT	−63.4%	−43.3%
NCREIF	−10.5%	−19.6%
GSCI	−51.3%	−59.7%
Credit Suisse/Tremont Hedge Fund	−19.0%	−13.7%

Notes: *S&P 500 peaked in October 2007 and fell until March 2009. Venture capital, private equity, and NCREIF returns are quarterly from 2007 Q4 through 2009 Q1. **Fiscal year is the twelve months ending in June 2009.

Data Sources: S&P, Cambridge Associates LLC U.S. Venture Capital Index[®] and Private Equity Index[®], ©FTSE, NCREIF, and Credit Suisse/Tremont.

in Chapter 9 on real estate, the NCREIF index is based on valuations, not market prices. Illiquid investments have stale valuations which are slow to reflect falling market values. Those stale valuations seem to shield investors from market downturns. But surely this is misleading.

Not all alternative investments are illiquid. Nor do all of them fail to reflect current pricing. The Dow Jones UBS Commodity Index and the Goldman Sachs Commodity Index are made up of commodity futures contracts which are constantly marked to market. So these indexes reflect current values. Nonetheless, commodities failed to protect investors from the crisis. The world recession that crushed equity valuations also leveled commodity markets. The GSCI fell 51.3 percent from October 2007 through March 2009, while the Dow Jones UBS Commodity Index fell 38.9 percent. Hedge funds, in contrast to commodities, did help to cushion investors from market turmoil during this period even though they are also marked to market.²⁴ The Credit Suisse/Tremont Hedge Fund Index was down only 19.0 percent over the 17- month period beginning in October 2007. It's true that some individual hedge fund strategies were down much more. Indeed, the Tremont market-neutral hedge fund index had a return of −41.8 percent over this same period. And it's also true that many hedge funds shut their gates preventing investors from cashing out. In such cases, it was not very reassuring that your hedge fund investments were only down 19.0 percent if you had no access to them in the crisis period.

This crisis provided almost no place to hide from losses even if losses on some asset classes were smaller than on others. Almost every investment yielded negative returns. The most important exception was Treasury bonds. As the financial world came close to crumbling, investors fled to the safety of U.S. Treasury bonds and the dollar. The return on Barclays Capital Long-Term Treasury Index was a positive 22.5 percent over this same 17-month period! In contrast, bonds with credit risk fell in the crisis. The Barclays (investment-grade) Corporate Bond Index returned -6.1 percent and the Barclays High Yield Index returned -23.2 percent.

So for investors who only invested in stocks and bonds, Treasury bonds alone shielded the investor from losses. For investors who also had alternative investments, some but not all alternative investments helped to limit losses in the portfolio. First, there were hedge funds which fell much less than stocks. The cushion to portfolios was provided not by non-market pricing but because hedge fund betas are relatively low. Then there were the illiquid assets where the *reported* returns, at least, were less negative than those of publicly traded equities or publicly traded REITS. So a portfolio with alternatives declined less than a comparable portfolio with only publicly traded assets (both equity and real estate).

Consider the ultra HNW Portfolio A described in Table 13-4. Recall that this portfolio had 25 percent in bonds, 50 percent in stocks, and 25 percent in alternatives. This portfolio fell 30.0 percent from October 2007 through March 2009.²⁵ The conventional portfolio in Table 13-4 with 75 percent in stocks and no alternatives had a -35.5 percent return. So holding private equity and hedge funds did help to cushion the returns reported during the crisis. But as discussed above, some of that cushioning was more apparent than real.

With this discussion of asset returns during the crisis as background, we can now consider Yale's performance during the crisis. As stated earlier, for the fiscal year ended June 2009 Yale had a return of -24.6 percent. How much of that is due to Yale's asset allocation and how much is due to manager performance? Table 13-7 attempts to estimate the return Yale would have earned just based on index performance. The table uses Yale's *actual* asset allocation in *June 2008*, just before the beginning of the 2009 fiscal year. The indexes used for each asset class are the same ones used for the indexed portfolio in Figure 13-9. As Table 13-7 reports, Yale's portfolio should have earned -26.0 percent in the 2009 fiscal year if it had just invested in the indexes themselves. Instead Yale actually earned -24.6 percent.²⁶ That's a relatively small difference given the large losses suffered in almost every asset class. So at least according to this (admittedly imperfect) measure of the indexed return, Yale's losses are due to its asset allocation and not due to the failure of its managers to perform relative

TABLE 13-7 Performance of Yale Endowment Compared with Indexes in Fiscal Year 2009 (July 2008 to June 2009)

Asset	Index	Weight	2009 Return
Bonds	MT Treasury	4.0%	5.5%
Cash	Treasury Bill	-3.9%	0.6%
Domestic Equity	Russell 3000	10.1%	-26.6%
Foreign Equity	2/3 EAFE/1/3 EM	15.2%	-29.9%
Real Assets	1/2 NCREIF, 1/2 GSCI	29.3%	-39.6%
Private Equity	1/2 VC, 1/2 PE	20.2%	-19.6%
Absolute Return	Credit Suisse/Tremont Hedge Fund	25.1%	-13.7%
Weighted Average			-26.0%
Yale Return			-24.6%

Notes: Weights represent Yale's actual asset allocation in June 2008 (before the 2009 fiscal year began). The foreign equity return is based on the EAFE return of -31.0 percent and MSCI EM return of -27.8 percent. Other returns are in Table 13-6.

Data Sources: Yale (2009), ©Morningstar, Russell[®], MSCI, NCREIF, S&P, Cambridge Associates LLC U.S. Venture Capital Index[®] and Private Equity Index[®], and Credit Suisse/Tremont.

to their benchmarks. Indeed, the managers on balance seem to have added marginally to Yale's performance even in the crisis.

So does Yale's loss in 2009 undermine its earlier performance? As David Swensen said in February 2009, *Propublica* (February 18, 2009).

For the period during which we're in crisis, the hoped-for benefits of diversification disappear. But once the crisis passes, then the fact that these different asset classes are driven by fundamentally different factors will reassert itself, and you'll get the benefits of diversification. It would be nice if we could always have the benefit of diversification, but life doesn't work that way.

VERDICT ON ALTERNATIVE INVESTMENTS

No doubt asset allocation is improved with the addition of alternative investments. The adoption of alternatives will not guarantee Yale-size returns because other investors do not have the advantages of the Yale Endowment. But alternatives do shift the efficient frontier in a northwesterly direction. This chapter has documented this shift by examining the alpha* of portfolios with and without alternatives. Investors can improve their risk-adjusted

performance with alternatives. They can reduce risk for a given return or increase return for a given risk. So alternatives are clearly desirable.

David Swensen expressed the view that ordinary investors could achieve a lot of this gain from diversification by sticking with conventional alternatives, real estate, and TIPS. In Swensen's portfolio for the ordinary investor, 20 percent of the allocation is given to real estate. The analysis above showed real estate investments do raise risk-adjusted returns, but the gain is small.

Diversifying beyond real estate to hedge funds and other alternatives is desirable, at least for those investors who are wealthy enough. But alternatives are no panacea for high net worth investors. Unless investors have access to the best managers, hedge funds or other alternatives are going to provide only modest improvement to the portfolio. The shift to the northwest is limited, or if excess returns are measured at a given level of risk, the alpha* is positive but relatively small. For HNW investors, that should still be enough of a recommendation.

NOTES

1. Estimated returns for these two assets are based on the real geometric average returns earned since 1951 of 2.4 percent and 6.7 percent, respectively. If long-term expected inflation is 2.5 percent a year, then the nominal compound returns are 4.9 percent and 9.4 percent per annum. These compound averages translate into the arithmetic averages needed for optimization of 5.0 percent and 10.0 percent, respectively.
2. Since the premium is measured using geometric returns, the estimated return on REITS is calculated as $(1.094)^*(1.016) - 1 = 11.2\%$.
3. The standard deviations and correlations for the Barclays Capital TIPS Index were calculated beginning in March 1997 and entered manually in the Zephyr software.
4. ~~Alpha* is obtained after adjusting the standard deviation of the conventional portfolio downward to that of the Swensen portfolio. The excess return of the Swensen portfolio is 0.3 percent at that level of risk.~~
5. The Credit Suisse/Tremont index is a value-weighted index. The HFRI Fund Weighted index starts earlier in 1990, but it is an equally-weighted index so it seems preferable to use the Tremont index whenever possible.
6. So the estimated return is 2.7 percent below the S&P 500 return because the return is calculated using the compound formula $1.094 * (1 - 0.025) - 1 = 6.7\%$.
7. This would certainly be true of an investor with \$5 million in wealth since many hedge funds have a minimum investment of at least \$1 million. In the analysis of ultra HNW portfolios that follows, we will consider the returns from direct investment in hedge funds using the Credit Suisse/Tremont index because diversification of manager risk should be possible for those investors.

8. The returns required by the Zephyr optimizer are arithmetic averages, so as explained in Chapter 8 the geometric averages must be converted to arithmetic averages.
9. In the Merrill Lynch-Cap Gemini World Wealth Report (2008), for example, ultra HNW investors are those who have at least \$30 million in financial assets excluding collectibles, consumer durables, and primary residences.
10. Recall that the private equity return measures buyout investments primarily.
11. Yale's allocation to fixed income was as much as 22 percent in the early 1990s, but that is still below the allocation to fixed income in most institutional portfolios.
12. The figures quoted are compound (geometric) averages. The arithmetic average returns were 15.0 percent for the Yale Endowment, 10.4 percent for the Russell 3000, and 10.7 percent for the S&P 500, the latter two indexes measured like the Endowment for the 12 months ending in June of each year.
13. The Yale Endowment (various years).
14. The chief real estate holding in 1985 was a single Manhattan office building at 717 Fifth Avenue. By the time Yale sold it in 2002, it had earned a 19.5 percent per annum return on its investment over a 24-year period.
15. Perhaps Yale has had influence on the allocations of other university endowments, particularly the larger endowments. Some of Swensen's colleagues have moved on to lead the endowments of other institutions, so Yale's influence may be both direct and indirect.
16. Percentages are U.S. dollar-weighted. Excludes U.S. assets held by public funds in defined contribution accounts. U.S. assets are projected to the 2009 Greenwich Associates universe of 2,040 institutional investors with \$ 250 million or more in total assets based on responses from 1,009 institutions.
17. The NACUBO figure is for 2008. In 2008, Yale's actual allocation to absolute return investments was 25.1 percent. In 2009, that allocation had fallen to 24.3 percent, but it's notable that the target portfolio allocation illustrated in Figure 13-5 includes only 15 percent in absolute return. So Yale evidently intends to cut back sharply on its absolute return investments in the future.
18. These benchmarks are not identical to those used by Yale itself. For example, Yale uses the Wilshire 5000 as its benchmark for U.S. equity investments. The correlation between this index and the Russell 3000 is 0.998, so this study will continue to use the Russell 3000 as the equity benchmark. For real assets, Yale uses the NCREIF real estate index as well as a Cambridge Associates composite. This study instead uses NCREIF plus a commodity index.
19. The private equity index begins in the second quarter of 1986, so only the venture capital index is used for 1985 and 1986.
20. The HFRI index begins only in 1990, but Yale added absolute return assets to its portfolio only in 1991. The Credit Suisse/Tremont value-weighted index is used as soon as it becomes available in 1994.
21. The Goldman Sachs index is preferable to the Dow Jones AIG index because the latter puts a limit on energy at 33 percent of the index.
22. NACUBO did not provide a dollar-weighted return for 2009. Through 2008, the dollar-weighted return was 3.8 percent below that of the Yale Endowment.

23. Harvard's experience with private equity supports this view. In late 2008, Harvard was reported to have tried selling some of its private equity stake only to have to withdraw the sale because of low bids. In its 2009 endowment report, Harvard estimates that its private equity investments returned -31.6 percent in fiscal 2009 (Harvard 2009). That return includes realized capital losses of \$439 million reported by *Forbes* (2009).
24. It should be noted that many hedge funds invest in illiquid securities, and marking to market involves estimation of the value of these securities, but on the whole hedge funds' returns rely much more on market pricing than private equity or direct real estate investments.
25. The crisis return of 30.0 percent is based on a 5 percent allocation to REITs (as in Table 13-4). If instead, the NCREIF valuation-based return is used for the real estate investment, then the portfolio return is -27.4 percent.
26. If the FTSE NAREIT index (instead of the NCREIF index) is used in the calculation of the real asset return, the benchmark return is -29.5 percent, so the difference between Yale's performance and the benchmark widens considerably.