Asset Allocation with Private Equity

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The aggregate value of private equity investments at December 31, 2003, was approximately $476 billion according to Venture Economics, the leading publisher of industry data.[1] Venture capital accounted for $135 billion of the total and leveraged buyouts accounted for $341 billion.[2] The estimated value of distressed debt is more than $300 billion; some might argue that the investable portion of this value could be included in the private equity total.[3] We have chosen to focus on venture capital and buyouts as the traditional components of private equity.

Exhibit 1 shows the relative size of various components of the investable capital markets, defined as that portion of those asset types considered feasible for investment worldwide. (It excludes privately held real estate and some private equity outside the U.S.) At the end of 2003 its aggregate value was $71.2 trillion.[4] Publicly traded stocks and bonds account for approximately 94% of the total, and real estate accounts for most of the rest.

Exhibit 1 also describes how the world's investors have allocated their collective wealth among competing investment opportunities, based on prices prevailing at the end of 2003. Private equity investments of $476 billion constitute just 0.7% of the total.

Private equity's share of the investable capital markets is both useful information and a good starting point for investors considering the appropriate allocation to the asset class. Investors who are particularly optimistic about the prospects for private equity can reasonably be expected to have allocations greater than 0.7% of their assets. Others, for whatever reason, hold none. Investors' overall holdings, however, must and do equal 0.7% of worldwide investment opportunities.

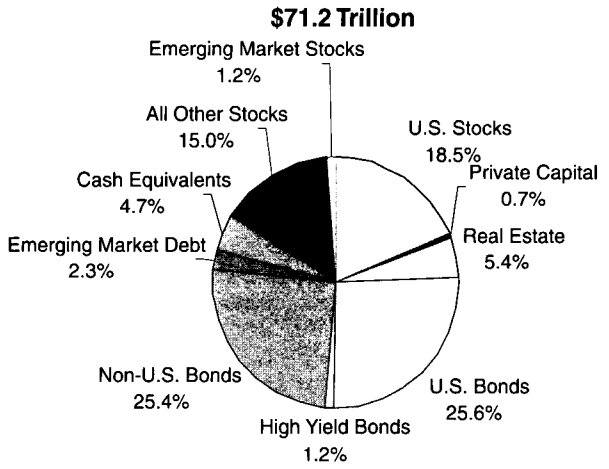
An implication of this fact is that *all* investors cannot maintain, say, a 5% allocation to private equity unless the value of private equity interests increases tenfold relative to the value of all other assets. This could happen if investors bid up the prices of private equity assets, i.e., increased demand for them. This would lead to the formation of more venture and buyout partnerships and, in turn, the funding of a greater number of individual start-ups and leveraged buyouts. A material increase in *the proportion* of private equity, however, could not reasonably be expected to occur overnight. This identity of the value of assets that exist and investors' aggregate portfolio allocation is important to bear in mind in formulating investment policy for any asset class.

EFFICIENT PORTFOLIO SELECTION

Efficient portfolios are those that offer the maximum expected return at a given level of risk, measured as the variability of annual return. They are commonly identified in practice using the technique of mean-variance optimization, which takes account of various assets' expected return, variability of return

EXHIBIT 1

Total Investable Capital Market (December 31, 2003)



Source: UBS Global Asset Management, Venture Economics, EnnisKnupp.

(standard deviation), and correlation of return with other assets.

Covariance Terms

We develop estimates of standard deviation and correlation using historical returns of assets trading in live, auction markets. Doing so ensures that the standard deviations express risk aptly and that correlations reflect synchronous trading of assets as much as possible. We use historical return data since 1978, the point in time when all the requisite data series become available, to estimate these "covariance" parameters. For publicly traded assets, we use return histories of the Wilshire 5000 Stock Index, the Morgan Stanley All-Country World (ex. U.S.) Index, and the Lehman Aggregate Bond Index. We use the Wilshire Real Estate Securities Index, with an adjustment to eliminate the effect of leverage, to characterize equity real estate returns. The CSFB Warburg Pincus/Venture Economics Post-Venture Capital Index (PVCI) is the proxy for private equity.

The PVCI tracks the performance of stocks of companies receiving venture capital or buyout financing and which have since gone public. The index tracks a stock from its public offering date until publicly traded for 10 years; after 10 years, the stock is removed from the index. If a company is acquired, merged to form a new corporate entity, or de-listed from an exchange, it is removed from the index. The index included 610 companies at June 30, 2004.[5] It is valued daily and returns exclude dividends.

Our goal at this stage of the analysis is to aptly characterize the standard deviation and correlation of the various asset classes. While an index of post-venture and post-buyout stocks may not be a valid index of the returns to private equity for, say, performance measurement purposes, it provides a public market-based approximation of the *riskiness* of private equity investing. In this regard, see Exhibit 2, which illustrates the risk-return relationship of various asset classes since the inception of the PVCI.

Exhibit 3 presents the standard deviations and correlations of all the asset classes over the 1978-2002 period.

Note in Exhibit 3 that the correlation of the private equity proxy with the U.S. equity market as a whole is

EXHIBIT 2

Risk-Return (February 1986–December 2003)

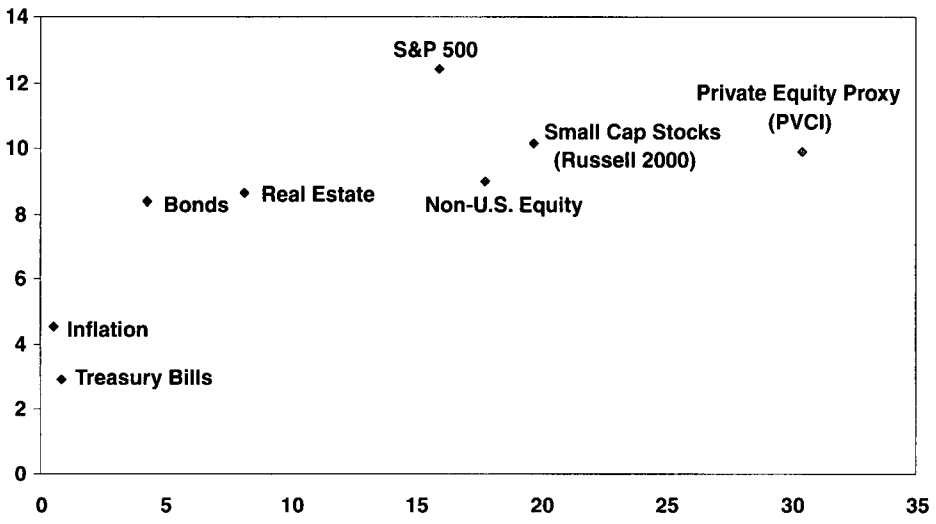


EXHIBIT 3

Standard Deviations and Correlations—1978 to 2002

Asset Class	Standard Deviation	Correlation Coefficient				
		U.S. Equity	International Equity	Real Estate	Private Equity	Fixed Income
U.S. Equity	16.7%	1.00				
International Equity	18.7	0.68	1.00			
Real Estate	12.1	0.62	0.46	1.00		
Private Equity	31.2	0.90	0.61	0.46	1.00	
Fixed Income	7.7	0.25	0.25	0.60	0.08	1.00

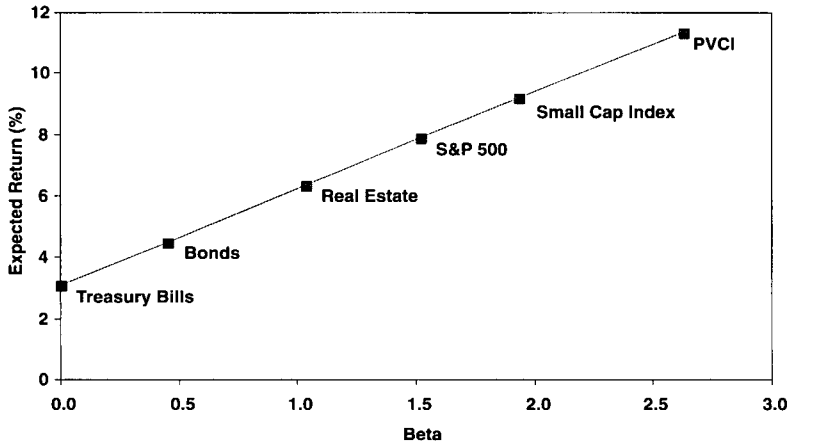
EXHIBIT 4

Betas, Risk Premiums, and Expected Returns

Asset Class	Beta with Respect to World Market	Correlation with World Market	Ratio of Beta to U.S. Equity	Risk Premium	Expected Nominal Return (Arithmetic)
U.S. Equity	1.65	0.88	1.00	5.1%	8.3%
International Equity	1.65	0.79	1.00	5.1	8.3
Real Estate	1.04	0.52	0.63	3.2	6.4
Private Equity	2.61	0.76	1.58	8.0	11.3
Fixed Income	0.45	0.75	0.27	1.4	4.5

EXHIBIT 5

Security Market Line



0.90. Squaring this value produces a figure of 0.81, indicating that approximately 80% of the variation in the return of the private equity proxy is linked to variation in the return of publicly traded stocks as a whole.

Expected Return

We use an equilibrium pricing framework in the spirit of Sharpe's capital asset pricing model (CAPM) to develop expected return for each asset class. Under CAPM, the expected return of every asset is proportional to the asset's market risk, or beta, relative to an index comprising all capital assets, also known as the market portfolio. We use the return series associated with the investable capital markets shown in Exhibit 1 to represent the return history of the market portfolio. The resulting expected returns and related statistics appear in Exhibit 4.

Strictly speaking, the 11.3% figure in Exhibit 4 is the expected return required for private equity investments to be priced in equilibrium with other assets, based on our estimates of standard deviation and correlation of all the assets. This expected return figure is the payment investors require for systematic risk or beta, consistent with CAPM. It excludes any additional compensation required by investors for other factors, such as the illiquid nature of private equity, the asymmetrical nature of information in private equity transactions, and/or the difficulty in diversifying these investments—all consequences of the private-market nature of private equity. But theory and evidence say that investors require an additional return premium to compensate them for these extra risk factors. Accordingly, the total expected return of private equity in all likelihood exceeds the value we use here, for this analysis concerns itself solely with relating expected return to systematic risk. We make no attempt to estimate the magnitude of the additional, private market premium for private equity; rather, we simply postulate that the premium arises in the course of market transactions and that it constitutes appropriate compensation for the extra risk characteristics of private equity investing. In other words, it has no effect on this analysis.

Exhibit 5 is the security market line, which illustrates the linear relation between expected return and beta.

Optimal Portfolios

With standard deviations, correlations, and expected returns in hand, we move on to portfolio selection using standard optimization methods. Exhibit 6 describes the resulting efficient frontier with real estate constrained at 10% or less of the total portfolio.

Private equity does not appear in efficiently diversified portfolios with 60% or less in equity investments. The range of private equity investments in efficiently

EXHIBIT 6

Composition of Efficient Portfolios

Expected Return	Standard Deviation	Sharpe Ratio	Percent Allocation				
			Domestic Equity	International Equity	Real Estate	Private Equity	Fixed Income
4.90%	7.49%	0.234	8%	2%	0%	0%	90%
5.24	4.62	0.274	14	5	0	0	81
5.58	8.00	0.301	20	8	0	0	72
5.91	8.60	0.319	23	11	5	0	61
6.25	9.35	0.329	27	14	10	0	49
6.59	10.21	0.333	33	17	10	0	40
6.92	11.21	0.333	37	20	10	1	32
7.27	12.29	0.330	42	23	10	2	23
7.60	13.43	0.327	46	26	10	2	16
7.94	14.62	0.323	51	29	10	3	7
8.28	15.82	0.319	52	32	10	6	0

diversified portfolios with 60% to 80% in equities is 1% to 2%. And only when equity investments make up the entire portfolio does private equity reach 5%. While the indicated levels of private equity investment no doubt will strike some as small, they are consistent with private equity's high risk and very small proportion of the investment opportunity set.

Mean-variance analysis indicates that private equity's potential to improve portfolio diversification exists primarily within *equity* portfolios rather than balanced ones. Balanced portfolios derive substantially all their diversification from common stocks, real estate, and bonds.

COMPATIBILITY

Investors need to be cognizant of their own particular circumstances in arriving at a decision to invest in private equity. Here we identify several factors potential investors should consider.

Access and Skill

The overarching question we would pose to any investor contemplating embarking on private equity investing is this: *How good do you expect to be at it?* Information concerning investment opportunities is asymmetric, meaning the market is inefficient. Costs are extremely high. And the assets themselves are volatile and illiquid. Consequently, one of the most important ingredients for success is having *highly skilled professionals with access to the best funds* operating in a discretionary capacity in all aspects of managing the private equity portfolio.

Exhibits 7 and 8 illustrate the point. They present various percentiles in the distribution of return for individual venture and buyout partnerships. For venture capital funds (*Exhibit* 7), over 50 percentage points of annual return separate the top- and bottom-quartile funds over the last 10 years; that spread is almost 40 percentage points over the last 20 years. In both periods, the median fund return is less than the return of listed stocks by more than 9 percentage points per year.

Exhibit 8 tells a similar story for leveraged buyout funds. A wide range of return separates the top and bottom quartiles, and the median fund underperforms the stock index fund by a wide margin. Random (unskilled) selection could have produced significant losses. Even diversified investment (median return) produces an unsatisfactory return when the opportunity cost to make private equity investments is the return foregone in public markets. These results are testimony to the importance of possessing exceptional skill in private equity investing.

Some pension and endowment funds have been able to attract and retain expert managers to their staffs, but providing competitive compensation and the proper environment are problems for many funds. Others turn to investment management firms specializing in the field. Excellent firms of this type exist, but they add to the cost of private equity investing, and this must be taken into account.

EXHIBIT 7

Range of Annualized Return of U.S. Venture Capital Funds (Periods Ending December 31, 2003)

	10 Years	20 Years
Upper Quartile Return	34.4%	23.2%
Median Return	1.3	1.5
Lower Quartile Return	-19.7	-13.9
Wilshire 5000 Index	*10.6*	*12.4*

Source: Venture Economics.

EXHIBIT 8

Range of Annualized Return of U.S. Leveraged Buyout Funds (Periods Ending December 31, 2003)

	10 Years	17 Years
Upper Quartile Return	26.0%	23.4%
Median Return	4.1	4.0
Lower Quartile Return	-11.5	-10.3
Wilshire 5000 Index	*10.6*	*11.6*

Source: Venture Economics.

EXHIBIT 9

Private Equity Investment by U.S. Institutions

	Pension Funds*	Endowment Funds (Greater than $1 billion)
1999	2.5%	N/A
2000	3.3	18.6%
2001	2.9	10.5
2002	2.9	8.2
2003	2.9	8.2

**Includes allocations to the categories "VC – Fund of Fund," "Venture Capital & LBO," and "Other Private Equity."*

Source: Cost Effectiveness Measurement, Inc.; NACUBO Endowment Study.

Risk Tolerance

Private equity investing is a risky business, and investors should take account of their tolerance for risk as part of their decision to invest. An investor's allocation to equity investments is frequently taken as an indication of risk tolerance. The mean-variance portfolio analysis discussed above indicates a direct relationship between overall equity percentage and the optimal allocation to private equity. If bonds make up more than about 30% of the portfolio, a private equity allocation may be inappropriate.

Liquidity Requirement

The less an investor needs liquidity, the greater is the tolerance for private equity investments. This rules them out for participant-directed defined contribution plans, but some give-up in liquidity need not be a significant barrier for many defined benefit pension plans, endowments, or foundation funds.

Portfolio Size

We have noted that the market for private equity investments is very small in the context of the investable capital markets. All else the same, and given a finite quantity of investment opportunities to go around—at least at prices investors currently consider attractive—investors with smaller portfolios have a comparative advantage over investors with larger portfolios. This has become apparent as mega-size public funds seeking to establish private equity portfolios have wound up tilting heavily toward buyout funds, as opposed to the smaller venture funds, and toward the larger buyout funds at that.

Internal Resources for Supervision

The investor should have knowledgeable staff resources dedicated to supervising private equity investments on behalf of the fund. These are more labor-intensive than public market portfolios. *Some* staff resources are required regardless of whether the private equity portfolio is managed internally or externally.

Board Experience

Boards that have experience with these types of investments can contribute to making the effort a success. They are more likely to be able to discern the expertise required to be successful and more likely to have the patience and understanding necessary to succeed with private equity investments.

Capacity for Confidential Dealing

Recently, another factor has arisen that may prove to further define investor compatibility with private equity investing. Owing to their public nature, some institutional investors have faced legal challenges to their keeping confidential some of the information they possess as private equity investors. As general partners of private equity funds determine what information they are prepared to release to the public domain, some public funds may find themselves excluded from certain investment opportunities.

It is difficult to generalize about the relative importance of these factors. A particular factor may be more important for one investor than another, and strength in one area may compensate for a limitation elsewhere. It is best to go over the factors one by one and make a judgment concerning their collective impact.

INVESTOR PRACTICE

Knowledge of the practices of investors generally can inform an individual investor's portfolio allocation decision. Assume we are a large, defined benefit pension fund. If we believe other investors similar to us generally make informed asset allocations, analyzing the collective result of their decision-making can provide valuable perspective, even if we have little or no knowledge of how they arrived at their decisions.

Exhibit 9 shows the average investment of U.S. pension and endowment funds in private equity in recent years. The pension fund data comes from Cost Effec-

tiveness Measurement, Inc. (CEM), and includes 134 U.S. pension funds with aggregate assets of $1.8 trillion. According to the most recent CEM survey, the average pension fund allocation to private equity is 2.9% of assets. The endowment fund data are from the National Association of College and University Business Officers (NACUBO) Endowment Study and describe the practices of 39 U.S. endowment funds with individual assets greater than $1 billion and aggregate assets of $134 billion.[6] According to the annual Endowment Study, private equity allocations by endowment funds with asset size greater than $1 billion averaged 8.2% in 2003. Note: The figures in Exhibit 9 are equal-weighted averages that include *all* the funds surveyed, including those with no private equity investments.

In practice, the distribution of allocation percentages is bimodal for both investor types, with a significant fraction of the funds with allocations of zero and the balance holding from a few to several percentage points. In the case of the CEM (pension fund) survey, more than half of the funds have no private equity investments whatsoever.[7] Therefore, we infer that those that do have private equity investments have an average allocation that is at least double the 2.9% average for all funds. Unfortunately, the actual figures are not available.

Helping to fill in the picture of investor practice is a biennial survey by Goldman, Sachs & Co. and Frank Russell that includes 166 North American public, corporate, and endowment/foundation funds. Among the public pension funds that in fact invest in private equity, the average allocation for 2003 was 5.9%; for corporate pension funds it was 7.7%. The comparable figure for endowments and foundations was 14.2%.[8]

The bimodal nature of the distribution of ownership percentages is consistent with investors applying compatibility criteria of the type discussed in previous section. Some institutional investors consider themselves well suited to make private equity investments, allocating 10% or more of their assets to them. Others, perhaps less well informed about private equity investing, having a lower tolerance of risk, less able to tolerate illiquid holdings, or simply less sanguine about the prospects for private equity, hold none.

Peer practice can't be the sole or even primary basis for arriving at asset allocation decisions. These data do, however, afford the decision-maker additional perspective by reporting how others have weighed the many complex quantitative and qualitative considerations that underlie a decision of this type.

SUMMARY AND CONCLUSIONS

The aggregate value of private equity investments is approximately $476 billion, accounting for just 0.7% of the investable capital markets. Nearly three quarters of the total exists as leveraged buyouts and the remainder as venture capital.

Mean-variance analysis indicates that private equity's potential to improve portfolio diversification exists primarily within equity portfolios rather than balanced ones. Balanced portfolios derive substantially all their diversification benefits from common stocks, real estate, and bonds. Only when the overall equity allocation exceeds 60% of assets does private equity even enter efficiently diversified portfolios. The private equity allocation only reaches 5% of assets for portfolios that are 100% equity.

Investor circumstance should play a role in determining whether an allocation to private equity is appropriate and how large it should be. Skill, risk tolerance, liquidity requirement, portfolio size, internal resources, board experience, and capacity for confidential dealing can all come into play in making the decision.

Among pension funds, fewer than half invest in private equity. The *overall* allocation of pension funds has been steady at about 3% in recent years. A larger fraction of endowment funds use private equity, and the overall average there is about 8%, down from over 18% in 2000.

Upon careful consideration, some thoughtful investors will rightly decide to exclude private equity from their portfolio. For others, private equity holdings of a few percentage points may be appropriate. Only moderate-size, equity-oriented funds with exceptional private equity investment skill, strong board-level support, and adequate staff resources should consider allocations as large as 10%.

ENDNOTES

[1]Source is VentureXpert Web from Venture Economics, Inc.

[2]Source is VentureXpert Web from Venture Economics, Inc.

[3]Source is the Altman High Yield Bond Default and Return Report. Includes public and private defaulted and distressed debt, with a total value of $321.3 billion as of June 30, 2004.

[4]Based on the UBS Global Asset Management Total Investable Capital Market, VentureXpert Web from Venture Economics, Inc., and internal Ennis Knupp + Associates analysis.

[5]Source is VentureXpert Web from Venture Economics, Inc.

[6]Of the 39 participating institutions, 28 were independent and 11 public.

[7]The median plan has a zero allocation to the "VC – Fund of Fund," "Venture Capital & LBO," and "Other Private Equity" categories.

[8]The Endowment/Foundation category in the 2003 data includes funds classified as "Other," which include Taft-Hartley plans, industry pension schemes, religious pensions, supranational plans, and life insurance companies.

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National Association of College and University Business Officers. *2003 NACUBO Endowment Study.*