HOSPITAL 100
For Hospitals & Health Systems

Hospital Solutions

White Paper Series

In cooperation with: Strategic Investment Group

October 2015

The Investment Portfolios of Healthcare Systems – Roles, Risks and Returns

By David Ordoobadi

The finances of healthcare systems are buttressed by investment portfolios serving a variety of roles. Most systems have a long-term investment pool that represents the keystone of the balance sheet, facilitating access to capital markets at reasonable cost and serving as a rainy day fund in the event of operating shortfalls or capital needs. Many also rely on pension portfolios, self-insurance trusts, and philanthropic funds of various stripes to support their activities. The role and relative importance of these various pools of assets differ dramatically across healthcare systems. There is also a surprisingly wide range of approaches to how portfolios are managed.

This paper is a collaboration between Hospital 100 and Strategic Investment Group and is based on a survey of the portfolio management practices of hospitals and health systems across the nation. The survey data highlight the widely divergent asset allocations of these investment portfolios, reflecting significant differences in both the circumstances of healthcare systems, their investment objectives, and appetite for risk. The paper reports on the main findings of the survey, uses the survey responses to construct three representative portfolios that span the risk/return spectrum, and analyzes how each of these representative portfolios would perform in different states of the world. In particular, the paper considers the following topics:

- The role of investment portfolios in supporting the operations of healthcare systems;
- The range of asset allocation strategies pursued; and
- The risk and return characteristics of representative portfolios.

Introduction

This paper is based on a survey of C-level hospital executives undertaken jointly by Hospital 100 and Strategic Investment Group. Survey participants were asked to characterize the role of investment portfolios in supporting their operations, and describe how these portfolios are managed. The purpose of the paper is to highlight the various roles that investment portfolios play in supporting the finances and operations of healthcare systems, and the even

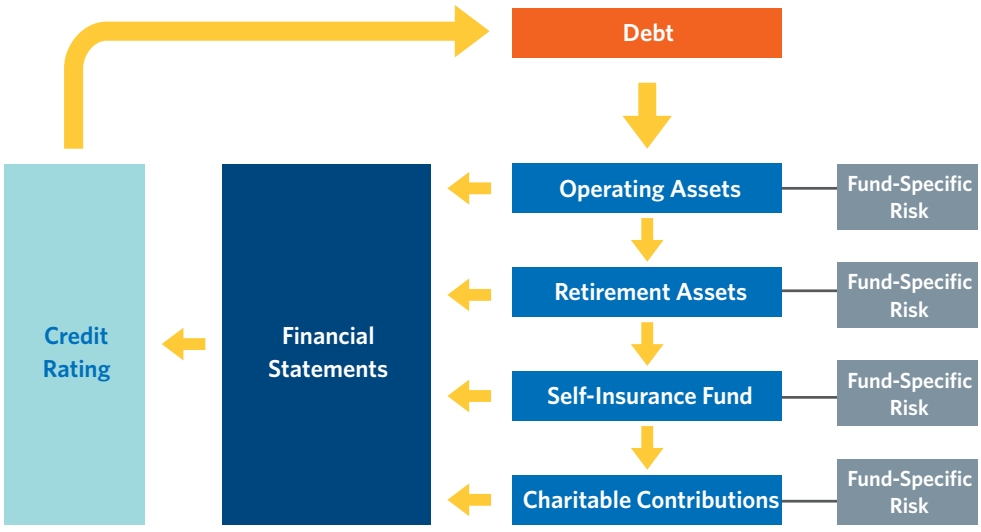
greater eclecticism in the portfolio management practices pursued. Using the survey data, it applies a range of analytical techniques to assess the risk and return characteristics of three representative long-term investment portfolios (LTIPs) in different states of the world.

The paper is structured as follows. We first examine the integral role played by the investment pools in the finances of healthcare systems, focusing on how investments and operations are linked. The strong link between investment performance and a system's financial strength underscores the need for a comprehensive asset/liability management framework for analyzing risk. In the second section, we report on how survey respondents characterized the role of investment portfolios in their operations and how these portfolios are managed. Finally, we analyze the asset allocation of different LTIPs and apply a rigorous risk assessment to three illustrative portfolios. These portfolios are designed to show three very distinct asset allocation approaches revealed by the survey data: portfolios encompassing only cash and bonds; multi-asset class portfolios that exclude such alternative investments as hedge funds, private equity, and real estate; and multi-asset class portfolios that include alternative investments. The analytical techniques used to illustrate how these portfolios would likely perform in different states of the world include a mean-variance analysis that places sample portfolios along an efficient investment frontier and historical scenario analyses.

Integral Role of Investments

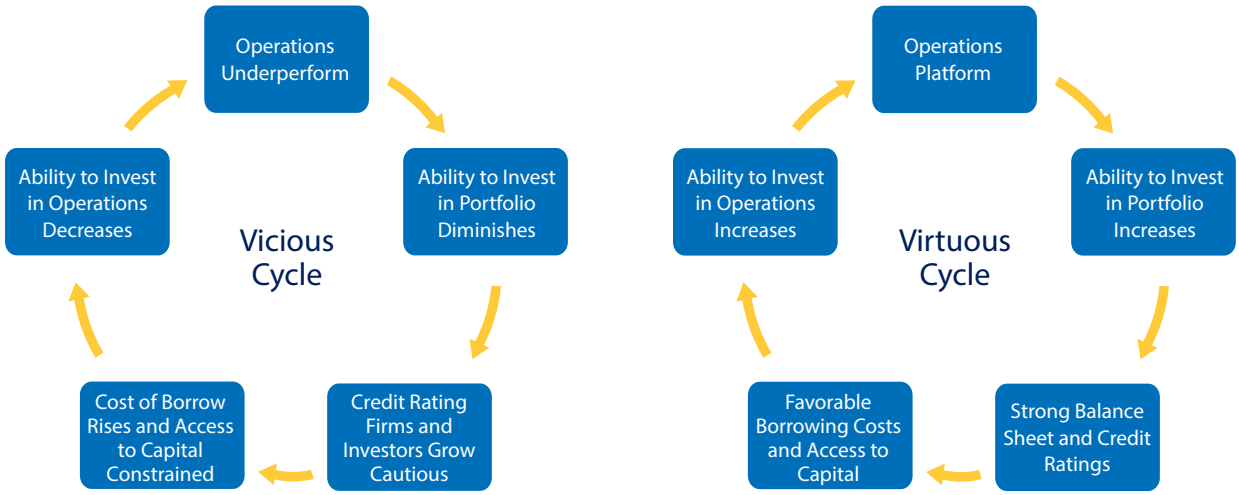
Large healthcare systems encompass a number of investment pools (Exhibit 1). The largest of these pools, the LTIP, serves as the keystone of the balance sheet, supporting capital expenditure, facilitating access to capital markets at reasonable cost, and providing an ad hoc or regular supplement to operating income. Many healthcare systems also have sizeable investments supporting a defined benefit pension plan. In addition, healthcare systems typically maintain smaller self-insurance funds and investment pools comprising charitable donations. Each of these multiple pools has its own specific objectives and constraints, but all are integral to the financial strength of the system. It is not enough to assess the risk and return characteristics of each investment pool in isolation; an aggregate picture of how the various investment portfolios combine and interact with the system's broader finances and operations is essential. Managing investment risk requires a comprehensive asset/liability management (CALM) approach to rigorously model and continuously monitor the potential impact of investments on the system as a whole.

Exhibit 1: A CALM Approach to Investing



The importance of a CALM approach to enterprise risk management is underscored by the potential of good and bad investment and operational outcomes to reinforce each other to create virtuous and vicious cycles (Exhibit 2). When all is well, favorable operating and investment results increase the potential to expand investments, which in turn contribute to balance sheet strength and a solid credit rating, facilitate access to capital markets at a reasonable cost, and support the scope of capital expenditure to enhance operations. In an adverse cycle, the unfavorable loop of poor operational and investment performance undercuts the system's financial strength and credit rating, and erodes the capacity for capital expenditure, which in turn further detracts from operating results. Given the potential for both favorable and unfavorable dynamics of this kind, carefully modeling the risk imparted by investments on a system's broader operations and finances through a CALM framework is critical.

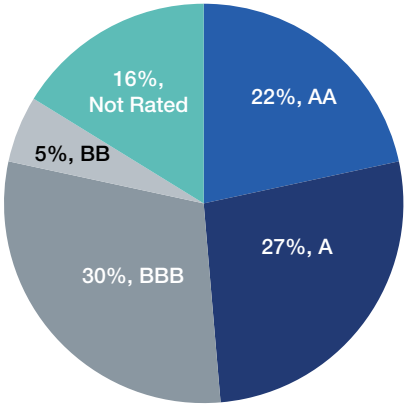
Exhibit 2: Virtuous and Vicious Cycles



Survey Respondent Profile

Of the respondents to the Hospital 100 Survey, the majority of investment portfolios boasted strong credit ratings. Over 90% were either investment grade or not rated, with just 5% rated BB (Exhibit 3). The importance of credit ratings to healthcare systems cannot be overstated, as almost 20% of the survey-takers believe that supporting credit ratings is the most important factor when considering the "right" return objectives and risk characteristics of their LTIP.

Exhibit 3: Which of the following most closely describes the credit rating of your organization (if applicable)?



Most respondents sought external sources to help achieve their investment goals (Exhibit 4). The most popular route was outsourcing, which 55% utilized, followed by almost 37% who manage assets in house with the advice of a consultant. Only 8% of respondents managed their portfolios exclusively in-house.

Exhibit 4: How do you manage your long-term investment portfolio?

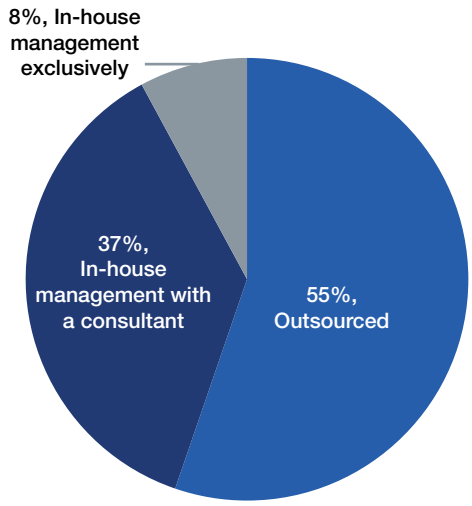
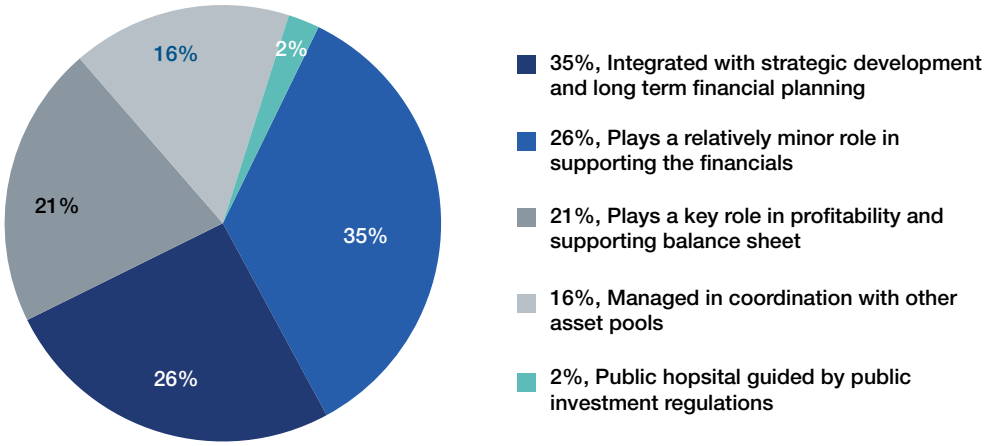


Exhibit 5 shows that the majority of survey-takers reported that their investment portfolio is integrated with their strategic development and long-term financial planning and/or plays a key role in their profitability and balance sheet support. Interestingly though, one-fourth of respondents said that their investments play a relatively minor role in support of their financials.

Exhibit 5: Which of the following best describes the role of your long-term investment portfolio in your broader financial operations?



Construction of Sample Portfolios

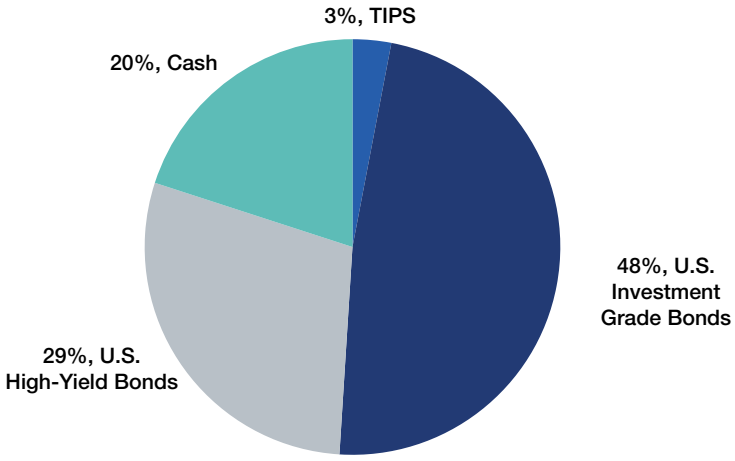
The sample portfolios are drawn from the Hospital 100's survey of its member health systems and hospitals as of the third quarter of 2015. There were 57 respondents providing data on LTIPs, ranging in asset size from less than $500 million to $2 billion.

Out of the sample of 57 survey participants from the survey, 18 participants provided the asset breakdown of their LTIPs. These responses revealed a wide range of asset allocation approaches. We constructed three distinct portfolio types to represent three different approaches to portfolio management revealed by the responses:

- Portfolio Type 1 is a "Fixed Income Portfolio", which includes U.S. Investment Grade Bonds, U.S. High Yield Bonds, TIPS, and Cash.

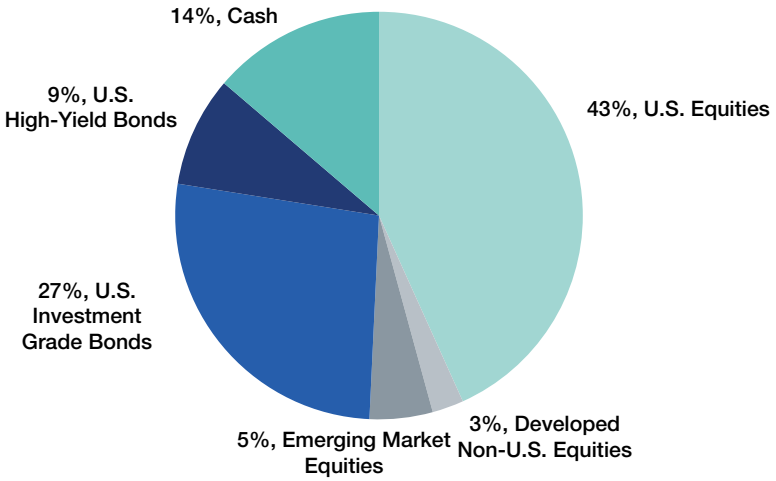
- Portfolio Type 2 is a "Multi-Asset Class Portfolio without Alternatives", which includes the asset classes of Portfolio Type 1, as well as U.S. Equities, Developed Non-U.S. Equities, and Emerging Markets Equities.
- Portfolio Type 3 is a "Multi-Asset Class Portfolio with Alternatives" and encompasses the "Multi-Asset Class Portfolio" as well as Private Equity, Hedge Funds, Real Estate, Commodities, and Non-U.S. Fixed Income.

Exhibit 6: Average Portfolio Breakdown for Portfolio Type I: Fixed Income Portfolio



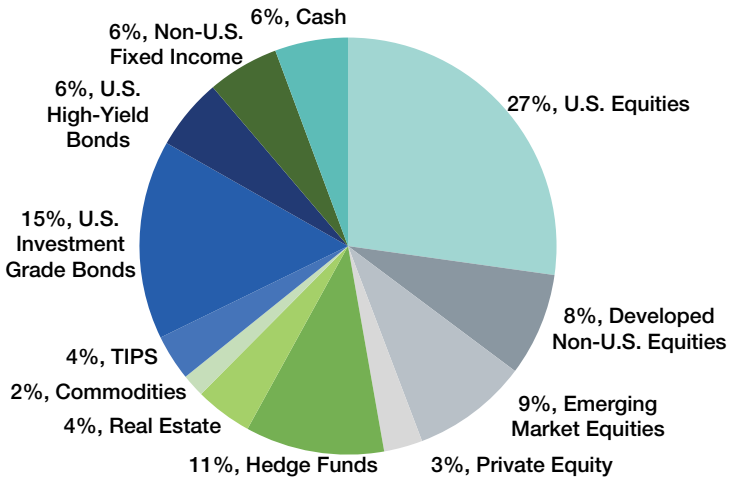
The Fixed Income Portfolio shown in Exhibit 6 represents the average asset allocation of respondents that utilized exclusively fixed income and cash. While broadly representative, the average allocation of the Fixed Income Portfolio encompasses highly diverse allocations, including one portfolio that is fully held in cash. As illustrated above, the representative Fixed Income Portfolio is largely allocated to U.S. investment grade bonds and cash, with the balance, representing less than one-third of the total, invested in U.S. high-yield bonds and Treasury Inflation-Protected Securities (TIPS).

Exhibit 7: Average Portfolio Breakdown Portfolio Type 2: Multi-Asset Class Portfolio without Alternatives



The representative average portfolio allocation of the Multi-Asset Class Portfolio without Alternatives is illustrated in Exhibit 7. About half of the assets of this portfolio are allocated to U.S. and non-U.S. equities, with the balance invested in fixed income (largely investment grade) and cash. Like the Fixed Income Portfolio, this representative average portfolio encompasses a highly diverse range of asset allocations.

Exhibit 8: Average Portfolio Breakdown Portfolio Type 3: Multi-Asset Class Portfolio with Alternatives



The representative average portfolio allocation of the Multi-Asset Class Portfolio with Alternatives is illustrated in Exhibit 8. About 40% of this representative average portfolio is allocated to U.S. and non-U.S. equities, another 40% is allocated to cash and fixed income, with the balance of 20% invested in alternative investments. As was the case of the previous two representative portfolios, the Multi-Asset Class Portfolio with Alternatives encompasses an eclectic collection of asset allocation approaches.

Each of the three representative average portfolios embody widely divergent return objectives and risk preferences of the healthcare systems concerned. As we saw in the first section on the integral role of investments in the broader finances of healthcare systems, a prime consideration is likely to be the role of the LTIP and its materiality to the rest of the balance sheet. Accordingly, each system's ability to absorb the volatility imparted to its broader operations by investment portfolios and the role of investments in complementing operational income and liability management are key factors in determining the asset allocations of its LTIP. Related factors influencing asset allocation preferences include other circumstances of the healthcare systems, such as the stability of operating income, debt levels, capital expenditure plans, and planned changes in strategic direction.

Representative Portfolios and the Efficient Frontier

Capital Market Assumptions

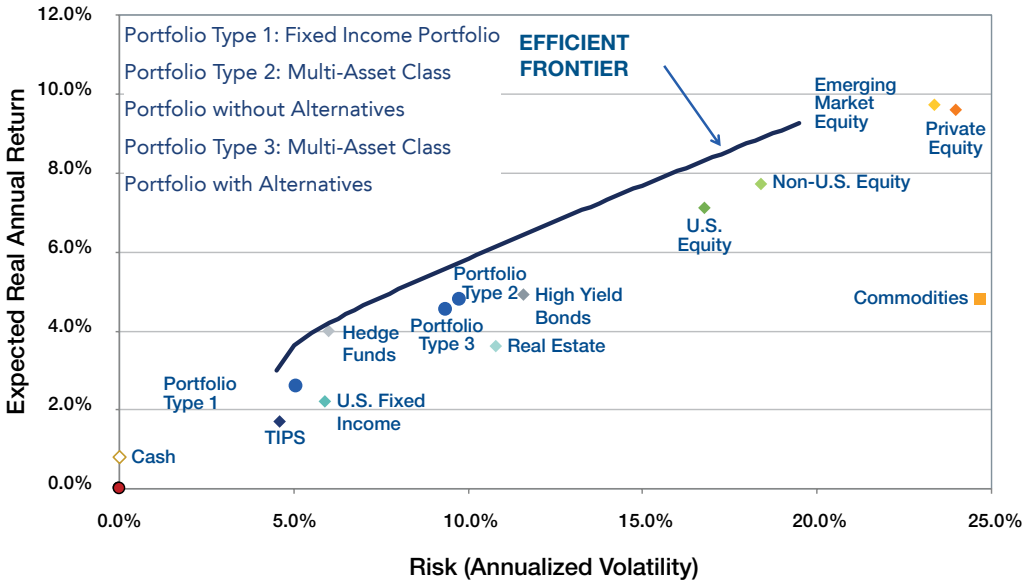
We have calculated the expected risk and return of the asset allocations of the selected representative LTIPs using Strategic Investment Group's proprietary capital market assumptions for the expected risk, return, and correlation characteristics of each asset class.

The capital market assumptions used in the analysis are derived from historical experience, adjusted to account for secular trends and to compensate for data inadequacies, including those arising from irregular pricing in illiquid markets. We also adjust the equilibrium expected market returns (or beta) to incorporate active return (or alpha) assumptions. We believe that it is appropriate to consider the potential for mispricing and the resulting scope for value added through security selection and structuring tilts across the various asset classes, and to incorporate this information into analyses of optimal portfolio construction. The active management returns and risk assumptions are based on historical data and forward-looking assumptions (using conservative information ratio estimates).

Efficient Frontier

Having calculated the expected risk and return characteristics of the representative portfolios using the capital market assumptions described previously, we plot each representative portfolio in relation to an efficient frontier (Exhibit 9). The efficient frontier represents the expected risk and return of optimally allocated portfolios. A portfolio on the efficient frontier has the maximum return achievable for its level of risk. Also shown are the risk and return assumptions for each major asset class used to construct the efficient frontier and calculate the expected risk and return of the three representative portfolio types.

Exhibit 9: Representative Portfolios on the Efficient Frontier



All three representative portfolios fall within the efficient frontier, suggesting a modestly suboptimal risk and return tradeoff. It would be possible in principle to change the asset allocation of the portfolios in a way to improve their risk-adjusted returns. Not surprisingly, the Portfolio Type 1, representing an allocation limited to fixed income and cash, is at the low end of the risk-return spectrum. In contrast, the representative multi-asset class portfolios (Types 2 and 3) have a higher expected return and risk.

Exhibit 10: Risk and Return Analysis of Representative Portfolios

ASSET CLASS	Portfolio Type 1: Fixed Income Portfolio	Portfolio Type 2: Multi Asset Class w/o Alternatives	Portfolio Type 3: Multi Asset Class with Alternatives
Equity	**0%**	**50%**	**43%**
U.S.		**42%**	**26%**
Developed Non-U.S.		**3%**	**8%**
Emerging Markets		**5%**	**9%**
Alternatives	**0%**	**0%**	**14%**
Private Equities			**3%**
Hedge Funds			**11%**
Real Assets	**3%**	**0%**	**10%**
Real Estate			**4%**
Commodities			**2%**
TIPS	**3%**		**4%**
Fixed Income	**77%**	**36%**	**27%**
U.S. Fixed Income	**77%**	**36%**	**21%**
U.S. Investment Grade	48%	27%	15%
U.S. High Yield	29%	9%	6%
Non-U.S. Fixed Income			**6%**
Non-U.S. Investment Grade			6%
Emerging Market Debt			
Cash	**20%**	**14%**	**6%**
Total	**100%**	**100%**	**100%**
Liquidity Score	**92%**	**97%**	**84%**
Nominal Net Return	**5.0%**	**7.3%**	**7.0%**
Volatility	**5.2%**	**9.8%**	**9.4%**
Real Geometric Net Return (Growth Rate)	**2.4%**	**4.3%**	**4.1%**
1 Standard Deviation Loss	**-0.1%**	**-2.6%**	**-2.4%**
2 Standard Deviation Loss	**-5.3%**	**-12.4%**	**-11.8%**
3 Standard Deviation Loss	**-10.5%**	**-22.2%**	**-21.2%**
Disequilibrium Nominal Net Return	**3.8%**	**6.7%**	**6.5%**

Exhibit 10 analyzes the expected return and risk of the three representative portfolios. At the low end of the risk and return spectrum, the Fixed Income Portfolio has an expected nominal return of 5.0%. The 5.2% expected volatility of this return quantifies the expected average variability around this return, which can be used to calculate the probability and magnitude of outcomes different from the average. For example, we can expect that this portfolio's return will fall within the range of +15.4% and -5.3% about 95% of the time, equivalent to a range of ± 2 standard deviations. The comparable range for the Multi-Asset Class Portfolio without Alternatives is +26.9% and -12.4%. To illustrate the impact of volatility on compound returns over time, we have included an estimate of the real geometric return, which is less than the expected average annual return as a result of the volatility drag on compound returns over time.

We have also calculated a liquidity score for each portfolio to highlight another dimension of risk that must be balanced in constructing the optimal portfolio. To model portfolio liquidity, we assign each asset class a percentage score. At the extremes of the liquidity spectrum, we give U.S. Treasuries and cash a score of 100% and private equity a score of 0%. In between are hedge funds (20%), open-end real estate funds (30%), and TIPS (90%). As we note in Exhibit 10, the Multi-Asset Class Portfolio with Alternatives, which has allocations to less liquid alternative investments and hedge funds, has a lower liquidity score.

The "right" level of portfolio liquidity needs to be carefully calibrated and is institution-specific. Too much liquidity could result in foregone opportunities to add value and increase portfolio efficiency. Too little liquidity can result in an inability to meet actual or contingent obligations on the portfolio. Moreover, liquidity is needed to rebalance the portfolio back to policy allocation following wide market swings. A failure to rebalance can significantly alter the risk characteristics and long-term return of the portfolio.

As discussed, long-term, or equilibrium, asset class returns are used as inputs to estimate the risk and return characteristics of the sample portfolios. However, it is certain to be the case that, at the time of analysis, market conditions will not be in equilibrium – some assets may be significantly misvalued. It is typically not useful to adjust for short-term disequilibrium conditions affecting relative asset prices, but better to handle such mispricing through tactical asset allocation decisions.

Current conditions in fixed income assets necessitate a more nuanced approach, however. Because of government intervention, real yields on U.S. government bonds and other safe-haven assets, as well as certain

corporate securities, are at extreme lows. We have estimated the disequilibrium real returns that would result if our expectations that interest rates will revert to more normal levels over the medium term are realized. As illustrated in Exhibit 10, the assumption of a reversion to equilibrium yields from current abnormally low levels over the medium term results in lower expected returns for the representative portfolios.

Importance of Risk Analysis for Sound Governance

Robust risk analysis is an essential component of good investment governance. Exploring potential negative outcomes helps to set appropriate expectations of portfolio volatility, and permits a more focused assessment of the impact of bad outcomes and the system's ability to withstand and adapt to adverse developments. Considering adverse scenarios helps avoid the common mistake of making ad hoc decisions in difficult circumstances.

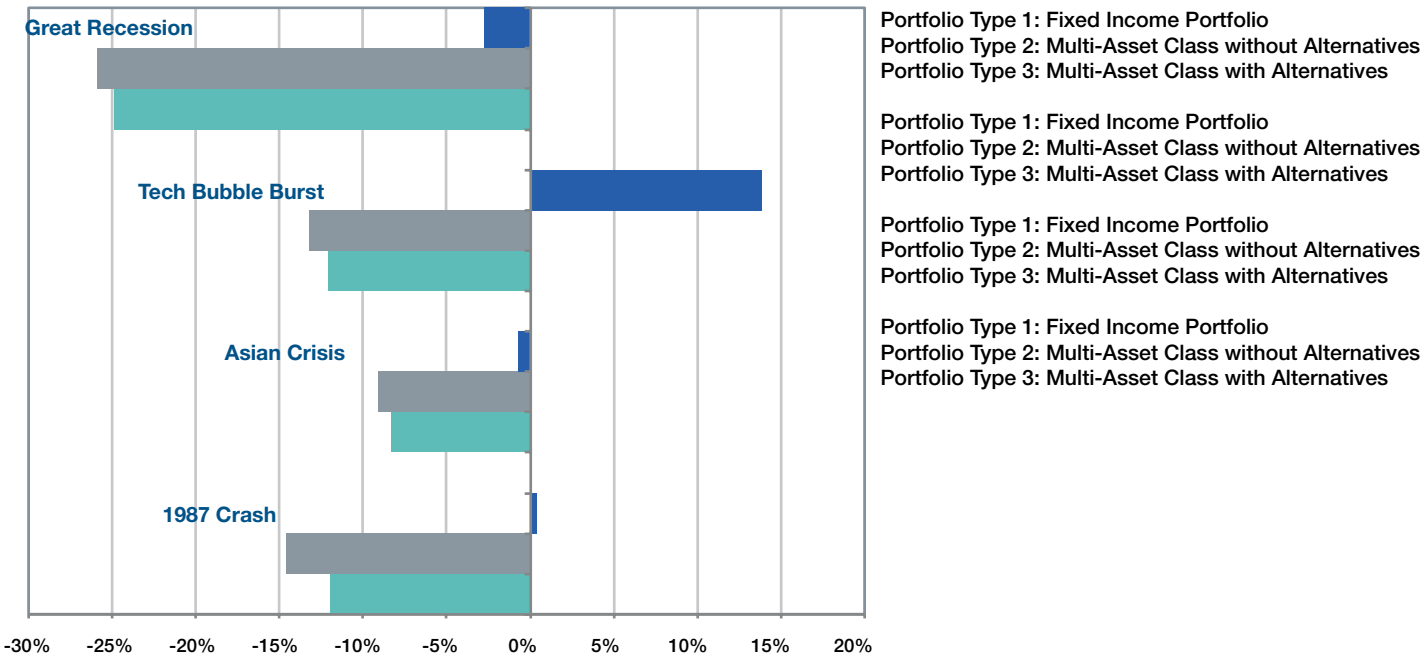
With those benefits in mind, we have extended the mean-variance risk analysis of the previous section to include a stress test based on a historical scenario analysis that illustrates how the representative portfolios would have performed in past periods of significant market disruption. Historical scenario analyses have the benefit of providing internally consistent market and economic movements against which to test the robustness of sample portfolios.

Historical Scenario Analysis

Considering how sample portfolios would have performed in historical episodes of market turmoil provides a further test of portfolio robustness, as these historical episodes encapsulate a wealth of information across economic and financial indicators of how markets have actually behaved under duress. Notably, these crises illustrate how the assumptions of mean-variance analysis can break down and highlight the extent to which return volatility and correlations can be unstable.

Exhibit 11 considers the peak-to-trough loss that would be experienced in the event of a recurrence of one of the four most recent financial market crises. It provides an indication of the steepest drawdown in asset value that would have resulted during each crisis in the case of the three representative portfolios reflecting responses to the survey.

Exhibit 11: Historical Scenario Analysis of Representative Portfolios



Conclusions

The sample portfolios drawn from the survey of the investment practices of healthcare systems illustrate a wide range of asset allocations and risk preferences across respondents. As illustrated in the results of the risk analytics undertaken, the sample portfolios would generate substantially different mean returns over time. The expected variability of returns is also quite dissimilar across sample portfolios.

As emphasized at the outset, it is essential to view the asset allocations of each LTIP in the context of the broader operations, finances, and strategic direction of the healthcare system whose mission it supports. The very strong integral link between investments and a healthcare system's financial strength suggests that one factor behind the widely divergent risk preferences of the various sample LTIPs considered reflects differing circumstances across healthcare systems. This link, and the potential for favorable and unfavorable feedback loops between investments and operations, argue strongly for the use of a CALM approach to judging the appropriate asset allocation for the LTIP and a healthcare system's other investment pools. A key extension of the analysis presented here is thus the undertaking of an institution-specific CALM analysis that incorporates other elements of a healthcare system's finances, including debt levels and related covenants, borrowing costs, credit rating metrics, the stability of operating income, liquidity requirements, the duration of pension liabilities, and the funded status of the pension plan.

[1] The paper is a collaboration of Hospital 100 and Strategic Investment Group. We welcome your comments on the data and analysis presented. Please address your comments to David J. Ordoobadi (dordoobadi@strategicgroup.com).

[2] This material is provided for educational purposes only and should not be construed as investment advice or an offer to sell, or the solicitation of offers to buy, any security. Opinions expressed herein are current as of the date appearing in this material and are subject to change at the sole discretion of Strategic. It is not intended as a source of any specific investment recommendation. The analysis contained in this paper is shown for illustrative purposes only, does not represent actual portfolio performance, and is subject to change at the sole discretion of Strategic. Actual portfolios and their performance may differ significantly from those shown here.

[3] Strategic Investment Group has developed the CALM approach as a framework for healthcare systems and other institutional investors to assess the appropriate structure of their investments and assess the types and level of risk arising from investments. The CALM analysis includes scenario analyses on the interaction of favorable and unfavorable investment and operating results on the system's financial strength and credit rating.

[4] The information ratio is calculated as the excess return of a strategy over a benchmark divided by the standard deviation of returns. A high information ratio suggests that there are opportunities for skilled managers to add value.

[5] The compound annualized growth rate (CAGR) likely to be realized will be lower than the expected average annual return as a result of the "volatility drag." The real geometric return incorporating the impact of the volatility drag is shown for each portfolio. The effect of the volatility drag can be approximated as: $(1 + \text{average return})^2 - (\text{standard deviation})^2 = (1 + \text{CAGR})^2$.

About the Author

David Ordoobadi is a Managing Director of Strategic Investment Group. Strategic, a pioneer in dedicated Outsourced CIO (OCIO) solutions since 1987, offers a comprehensive service platform and acts as its client's investment office and an extension of their staffs. As of 6/30/2015, Strategic manages $36.2 billion in assets, with over 45% focused on the healthcare sector.