

Rethinking asset allocation at health care organizations

A holistic approach to portfolio construction optimizes enterprise-level risk and return

June 2019

IN BRIEF

- Health care asset pools have grown in size and constitute a more critical element of an organization's operations, affecting its ability to achieve its mission.
- We believe it is important to take a holistic approach rather than a siloed view of portfolio construction across asset pools.
- We assess strategic asset allocation across multiple pools and sets of investment constraints. Our goal is to optimize diversification benefits while simultaneously achieving the goals of each individual pool and the organization overall.
- Applying a market-sensitive approach gives us a comprehensive view of how risks interact in the context of asset allocation decisions and ultimately impact a health care enterprise's financial flexibility.
- A case study illustrates an application of our framework.

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BY ANY MEASURE, IT'S A DAUNTING LIST. The roster of challenges facing health care systems includes demographic shifts, pressure on operating margins, demand for greater transparency from rating agencies, increased regulations and reporting requirements, and intensified competition and M&A activity. And systems must also grapple with the complexities of managing risks across an organization's various asset pools and their impact on the enterprises' financial flexibility.

Against the backdrop of these varied challenges, health care asset pools have become larger and more critical elements of an organization's operations, affecting its ability to achieve its strategic vision. Over the past few years, M&A activities and solid revenue growth have contributed to the growth of investment pools, both on average and in aggregate (**EXHIBIT 1A**).¹ Additionally, recent sponsor contributions and a continued bull market have led to even more dramatic growth rates in defined benefit (DB) pension assets (and, unfortunately, an even higher growth rate in pension liabilities as seen in **EXHIBIT 1B**).

Given the larger size of asset pools, combined with emerging late-cycle market challenges, risk management, with an eye on enterprise-level implications, must be top of mind.

A HOLISTIC APPROACH TO PORTFOLIO CONSTRUCTION ACROSS ASSET POOLS

While health care organizations have multiple asset pools, each pool has distinct characteristics and unique objectives, leading to divergent investment solutions (**EXHIBIT 2**).

¹ As noted in an April 2019 Moody's report, the revenue growth rate has edged ahead of expenses for the first time since 2015.

Growing investments and pension pools demand a closer look at asset allocation strategy

EXHIBIT 1A: NFP HOSPITALS TOTAL BALANCE SHEET ASSETS

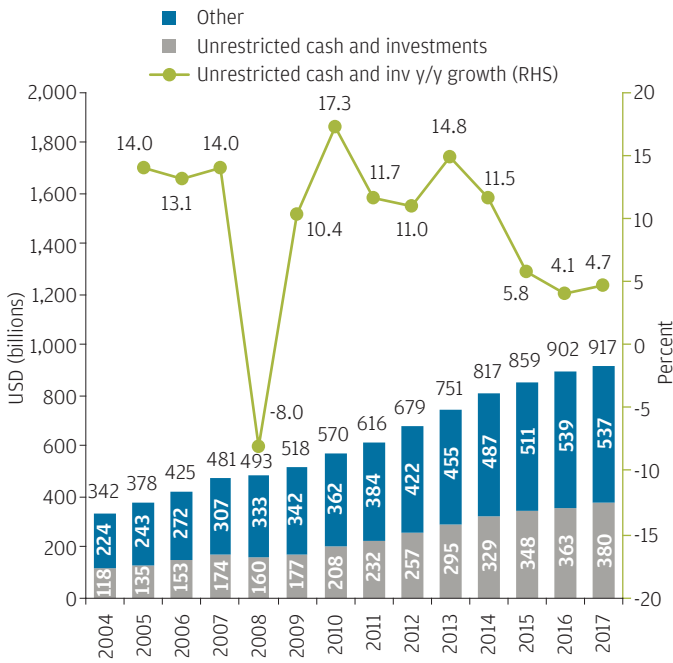
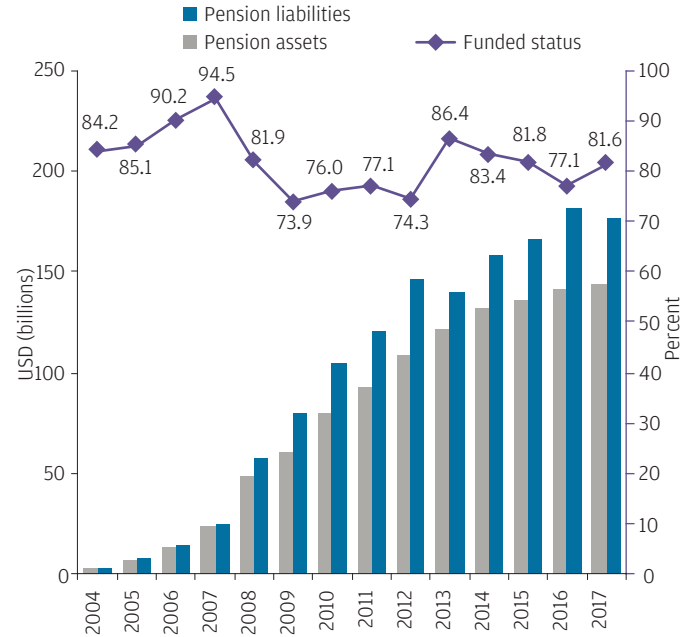


EXHIBIT 1B: NFP HOSPITALS DB PENSION ASSETS AND LIABILITIES



Source: Moody's Analytics, J.P. Morgan Asset Management; data as of fiscal year 2017. For illustrative purposes only. The not-for-profit (NFP) hospital universe is based on Moody's coverage of ~300 U.S. entities as of FY 2017 (number of entities covered for previous years shown in the chart may vary based on Moody's coverage for that given year). "Other" includes assets on hospital balance sheets outside of unrestricted cash and investments. This includes (but is not limited to) property, plant, equipment, receivables, etc.

However, these pools also have some important shared features. They are all contained within the same organization, jointly impacting both short-term operations and long-term planning; the pools are all exposed to similar market risks, from interest rate sensitivity to equity beta, albeit to varying degrees. Some health care organizations take a siloed approach to portfolio

construction across pools. Given the interrelated risks and organizational impact, we believe it's critical to take a holistic approach to portfolio construction across all asset pools, optimizing overall enterprise-level risk and return while incorporating the unique constraints and goals of each pool individually.

Defining the objectives and characteristics of multiple asset pools is the first step in setting an appropriate asset allocation

EXHIBIT 2: HEALTH CARE SYSTEM COMPONENTS

	Typical pool objectives	Liability characteristics	Liability duration	Liquidity needs
Long-term investments/ board-designated/ funded depreciation	<ul style="list-style-type: none"> Manage volatility while achieving returns to support strategic initiatives 	NA	NA	Low
DB pension	<ul style="list-style-type: none"> Maintain or improve funded status by achieving expected return on assets in line with growth of plan liabilities Minimize funded status volatility to manage future contribution 	Mature plans Mostly certain	Long	Low-medium
Insurance pool	<ul style="list-style-type: none"> Achieve yield target to maintain surplus and liquidity to pay claims 	Fixed near-term Uncertain	Short-intermediate	Medium-high
Short-term investments/ operating pool	<ul style="list-style-type: none"> Maintain liquidity for operating needs 	Fixed near-term Mostly certain	Short	High
DC QDIA*	<ul style="list-style-type: none"> Maximize the number of participants that achieve a minimum wage replacement threshold Maximize participant account balances 	NA	NA	High

*QDIA: qualified default investment alternative

Source: J.P. Morgan Asset Management. For illustrative purposes only.

EXHIBIT 3A illustrates a typical health care system’s total consolidated balance sheet as it would be shown in financial statements. To measure the market-related risks that we can address through asset allocation decisions, we strip out the balance sheet elements that are market sensitive (**EXHIBIT 3B**). In doing so, we also showcase hidden risks that are often understated or even invisible at the level of the total health care system balance sheet. For example, the defined benefit pension appears as a \$140 million net liability, just over 5% of the organization’s total liabilities. However, through the market-sensitive lens we see that there are actually \$1.25 billion of pension assets and \$1.39 billion of pension liabilities, just under 50% of total market-sensitive liabilities. Furthermore, both the market-sensitive liabilities and assets are volatile and tend to move in opposite directions just when an organization can least afford a required cash contribution and downgrade in balance sheet strength metrics.

Applying the market-sensitive approach enables us to analyze these underlying risks for each asset pool, on its own and in combination with other asset pools. This comprehensive view of

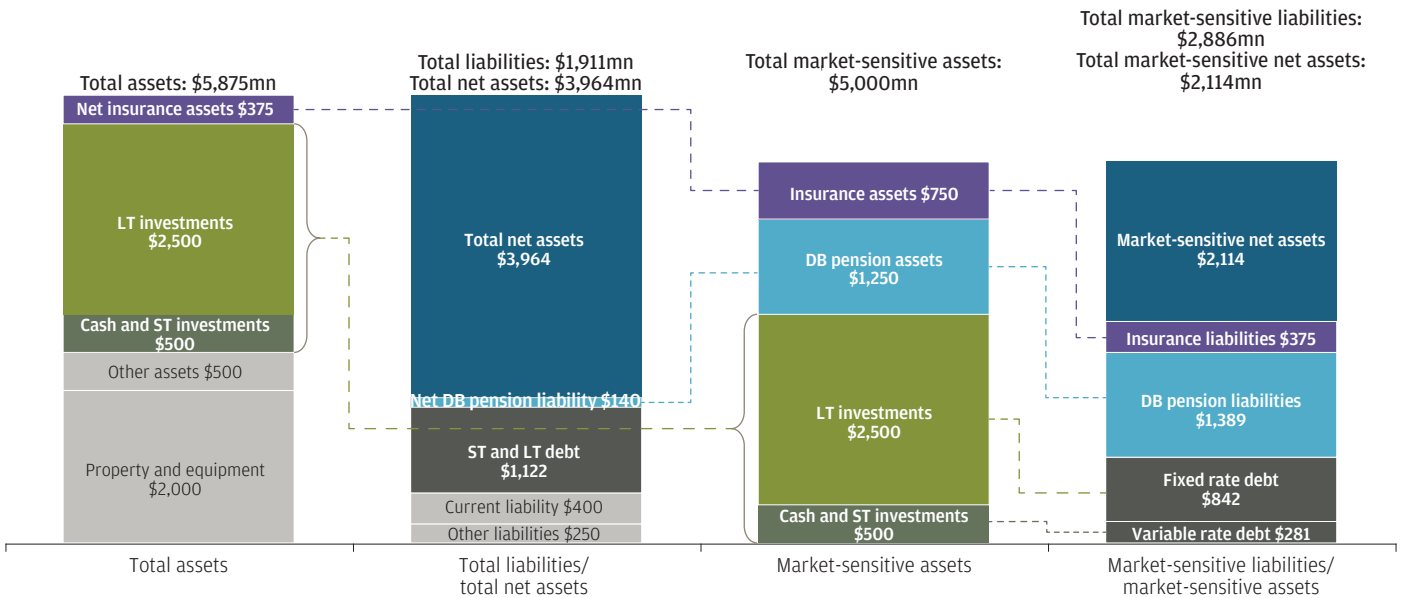
how risks interact, in combination with return objectives, informs the appropriate asset allocation strategy for each pool. When asset allocation is optimized both within and across investment pools, it can help an organization strengthen its ability to enhance its debt-capital structure, manage liquidity needs, achieve operational efficiencies and support capital expenditures.

Below we discuss our asset allocation optimization framework, focusing on a metric that captures the comprehensive impact of market risks on an organization: market-sensitive net asset volatility. This metric, which measures the volatility of balance sheet net assets affected by market movements—that is, overall financial risk—captures the benefits of asset allocation designed to diversify market-related risk exposures within an organization’s assets and liabilities as a whole. Those benefits may be neglected in a siloed approach to asset allocation. Although we focus on net asset volatility as the preferred metric to measure overall financial risk, the optimization framework can be customized to other key risk statistics. An illustration of our framework is shown in **EXHIBIT 4**.

Applying a market-sensitive approach gives us a comprehensive view of how risks interact

EXHIBIT 3: HEALTH CARE SYSTEM ASSETS AND LIABILITIES

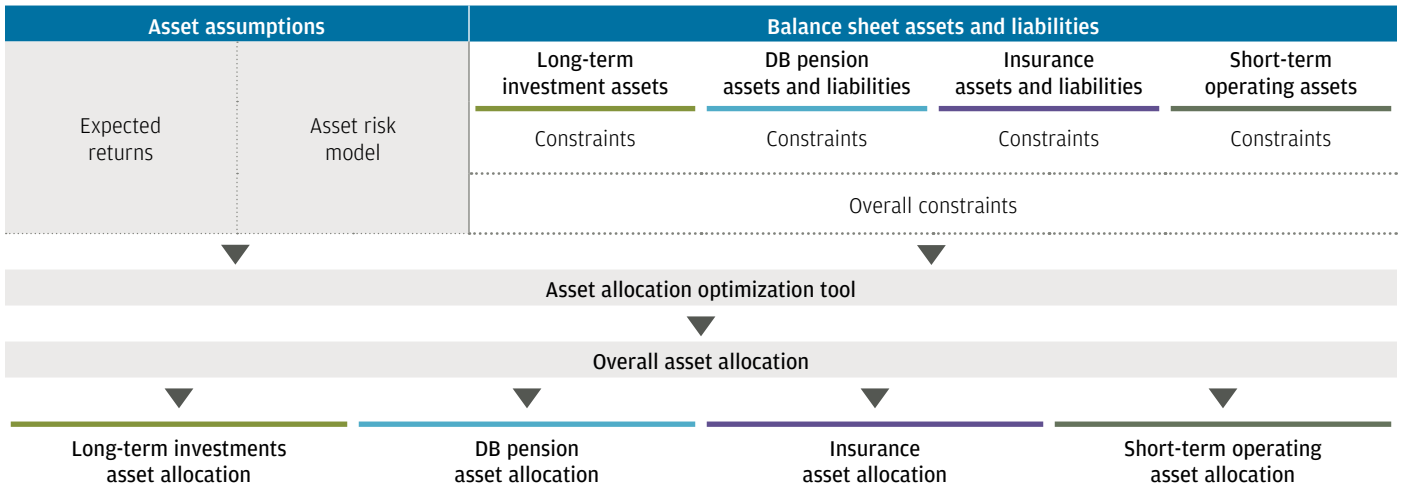
3A: TOTAL BALANCE SHEET ASSETS AND LIABILITIES (\$MN) – AS REPORTED IN FINANCIAL STATEMENTS 3B: MARKET-SENSITIVE ASSETS AND LIABILITIES (\$MN)



Source: J.P. Morgan Asset Management. For illustrative purposes only.

We assess strategic asset allocation across multiple pools and sets of investment constraints. Our goal is to optimize diversification benefits while achieving the goals of each individual pool as well as enterprise-level objectives.

EXHIBIT 4: ENTERPRISE-LEVEL STRATEGIC ASSET ALLOCATION FRAMEWORK



Source: J.P. Morgan Asset Management. For illustrative purposes only.

CASE STUDY

A case study illustrates an application of our framework. The hypothetical ABC health care system has three distinct market-sensitive asset pools: the long-term investment pool, the DB pension pool and the short-term operating pool. It also has three distinct market-sensitive liability pools: DB pension liabilities, fixed rate debt and variable rate debt. **EXHIBIT 5** provides an overview of the organization’s financial metrics

and asset/liability pools. The ABC health care system views its long-term investments as a funded depreciation pool to support fixed rate debt obligations, while the cash/short-term pool is linked to variable debt obligations. The current allocations for the DB pension and investment pools are generally diversified across financial assets, with modest allocations to alternatives including hedge funds, real estate

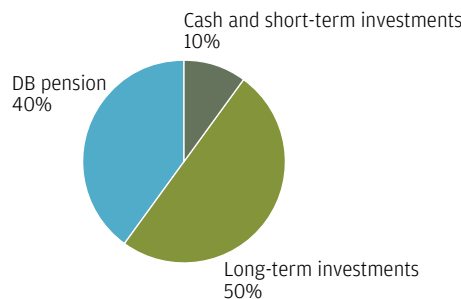
A DB pension represents a significant portion of the market-sensitive assets and liabilities of a sample health care system

EXHIBIT 5: KEY METRICS FOR A SAMPLE HEALTH CARE SYSTEM

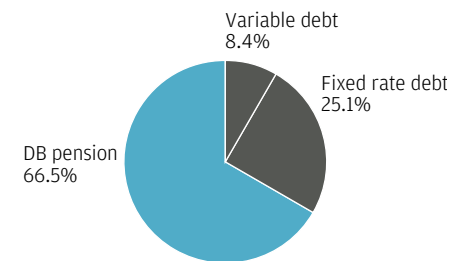
5A: ABC HEALTH CARE SYSTEM ENTERPRISE PROFILE

Debt rating	AA
Days cash on hand (DCOH)	249
Cash to total adjusted debt	223%
Debt to capitalization	28.6%

5B: ASSETS (% OF TOTAL MARKET-SENSITIVE ASSETS)



5C: LIABILITIES (% OF TOTAL MARKET-SENSITIVE LIABILITIES)



Asset	Liability	Characteristics
Pool 1 Long-term investments	Fixed rate debt	Assumed 100% unrestricted*
Pool 2 DB pension assets	DB pension liability	The plan is closed to new entrants and frozen with a liability duration of 13 years. The pension funded status on a GAAP basis is 90%.
Pool 3 Cash and short-term investments	Variable rate debt	Liquidity source for operating needs

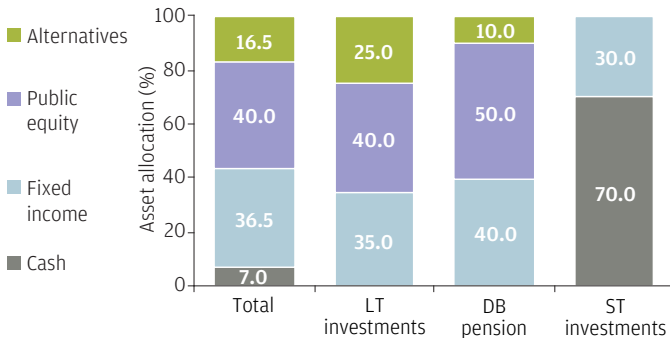
J.P. Morgan Asset Management. For illustrative purposes only.

*Unrestricted assets are included in key metrics like days cash on hand (DCOH), whereas restricted assets are excluded.

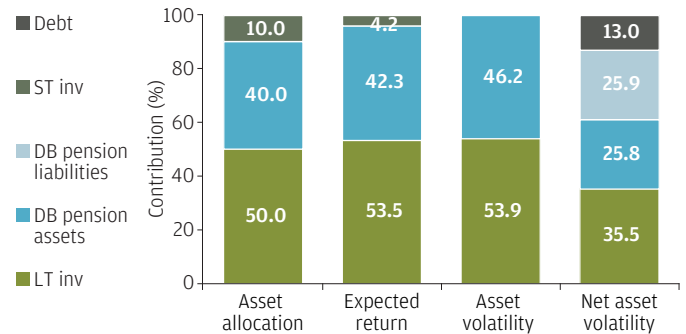
The DB pension pool is the largest driver of net asset volatility

EXHIBIT 6: CURRENT ASSET ALLOCATION, RISK-RETURN PROFILE

6A: PORTFOLIO ALLOCATIONS AND STATISTICS



6B: RISK-RETURN CONTRIBUTION



6C: CURRENT PORTFOLIO STATISTICS

	Total	LT investments	DB pension	ST investments
ASSETS/LIABILITIES				
Asset value (\$mn):	5,000	2,500	2,000	500
Liability value (\$mn):	3,344	842	2,222	281
Asset/liability ratio (%)	149.5	297.1	90.0	178.3
ASSET-ONLY METRICS				
Expected return (%)	5.50	5.88	5.82	2.30
Asset volatility (%)	6.98	7.56	8.13	0.63
Sharpe ratio	0.501	0.513	0.470	0.482
Expected income (%)	2.72	2.58	2.99	2.35
Total duration (yr)	2.76	2.05	4.17	0.63
World equity beta	0.42	0.46	0.47	-0.01
Worst-quarter return (%)	-8.50	-10.16	-8.80	-0.12
Max drawdown (% of peak)	-23.13	-25.25	-26.34	-0.12
ASSET-LIABILITY/BALANCE SHEET METRICS				
Net asset volatility (%)	7.35	7.53	9.91	1.45
Hedge ratio (%)	40.0	NA	28.9	NA
Net asset VaR95 (\$mn)	546	NA	321	NA
Worst A/L ratio return (%)	-33.17	NA	-20.60	NA
DCOH volatility (days)	16	NA	NA	NA
Worst-quarter DCOH (days)	228	NA	NA	NA

Source: J.P. Morgan Asset Management. For illustrative purposes only.

and private equity (EXHIBIT 6A).² Looking broadly at risk-return contribution (EXHIBIT 6B) and more specifically at the decomposition of risk and return (EXHIBIT 6C), we see that despite being the largest asset pool, long-term investments have a smaller impact on net asset volatility than does the pension plan. Note that portfolio metrics other than the key operating statistics illustrated in the case study are market-sensitive metrics—for example, expected return and net asset volatility.

In order to devise a portfolio recommendation for each asset pool, we run an enterprise strategic asset allocation optimization, minimizing net asset volatility (our metric for enterprise risk) at various expected return targets, subject to a set of constraints. The constraints, sourced from experts across the firm and our own experiences partnering with health care organizations, aim to ensure that portfolio solutions can be practically implemented. For simplicity, in this exercise we keep the short-term investment pool asset allocation constant while solving for the optimal long-term investment and pension portfolio.

² The typical DB pension plan is modeled based on the aggregate funded status and asset allocation of defined benefit pension plans of companies in the S&P 500, sourced from S&P Capital IQ and 10-K filings. A custom liability cash flow stream was created to approximate the liability and funded status, discounted on the FTSE Pension Discount Curve. Liability movement is based on the key rate duration match weight of U.S. Corporate AA bonds with various maturities. The typical health care investment pool is modeled based on the 2018 Commonfund Study of Healthcare Organizations (CSHO).

EXHIBIT 7 compares the current and optimized portfolios, analyzing each asset pool individually, as well as the combined contribution to enterprise risk. Relative to the current allocation, the optimal allocation, in aggregate, reduces net asset volatility while simultaneously boosting expected return. We also see improvements in days cash on hand (DCOH), a related metric. Lower DCOH volatility and higher worst-quarter DCOH (reflecting excess liquid resources during stress) are desirable since rating agencies often evaluate liquidity (for example, DCOH, cash to debt) along with profitability (e.g., operating margin, EBITDA margin) and leverage (e.g., debt to capitalization) metrics to determine an organization’s debt rating and ultimately its cost of capital.

Relative to the current portfolio at the total enterprise level, the optimized portfolio:

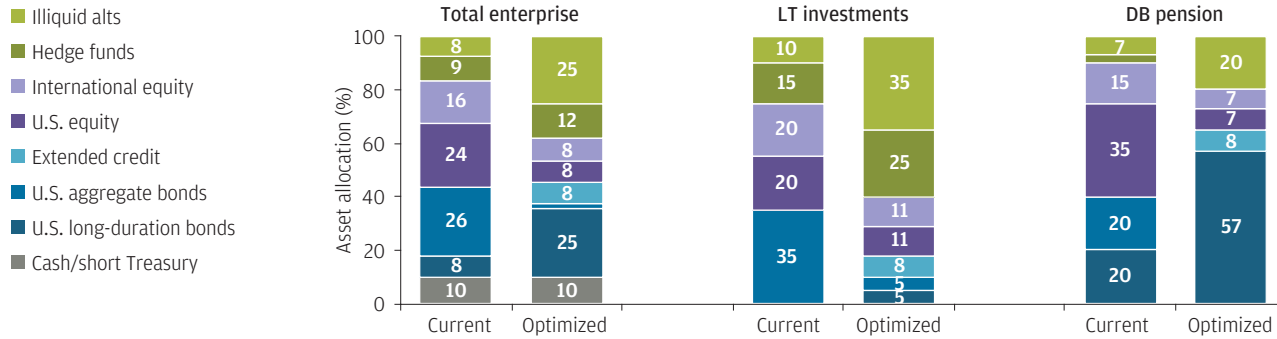
- boosts expected return by 63 basis points (bps)
- reduces expected asset volatility by 133bps
- reduces net asset volatility by 175bps
- improves DCOH volatility by four days

Asset allocation themes of the resulting portfolios:

- Long-duration bonds reduce the pension plan’s duration mismatch, one of the largest organizational market risks, while significantly reducing net asset volatility.
- Extended credit provides an efficient source of yield, with expected returns in excess of investment grade but with lower volatility than public equities.

Optimized portfolios improve metrics for both the total enterprise and the individual asset pools

EXHIBIT 7: CURRENT VS. OPTIMIZED PORTFOLIOS

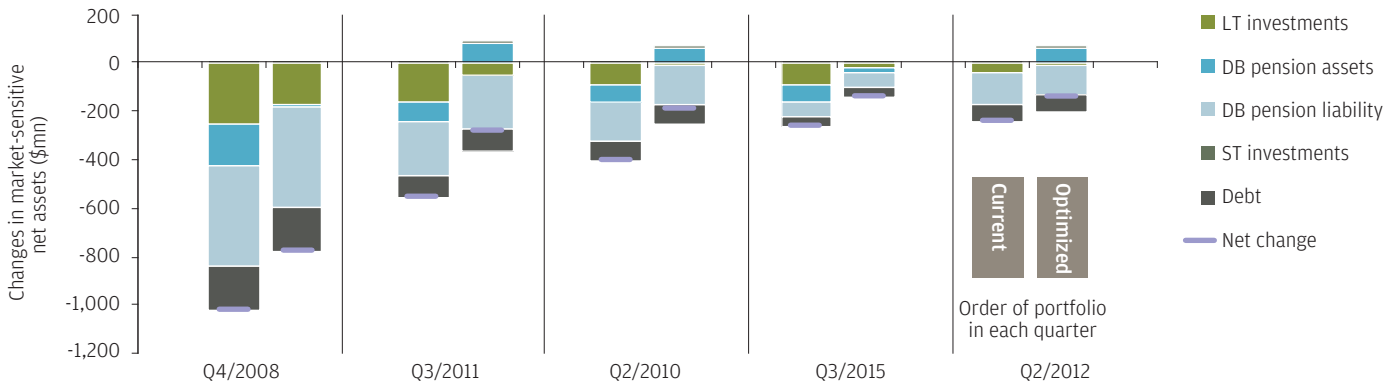


Statistics	Total enterprise			LT investments			DB pension		
	Current	Optimized	Δ	Current	Optimized	Δ	Current	Optimized	Δ
ASSET-ONLY METRICS									
Expected return (%)	5.50	6.13	+63bps	5.88	6.79	+91bps	5.82	6.27	+45bps
Asset volatility (%)	6.98	5.65	-133bps	7.56	6.12	-144bps	8.13	7.58	-55bps
Sharpe ratio	0.501	0.731	+0.230	0.513	0.782	+0.269	0.470	0.563	+0.093
Expected income (%)	2.72	3.20	+47bps	2.58	2.51	-8bps	2.99	4.27	+128bps
Total duration (yr)	2.76	4.29		2.05	1.57		4.17	8.60	
World equity beta	0.42	0.26	-0.16	0.46	0.30	-0.16	0.47	0.27	-0.20
Worst-quarter return (%)	-8.50	-6.47	+203bps	-10.16	-6.80	+336bps	-8.80	-7.90	+89bps
Max drawdown (% of peak)	-23.13	-15.48	+765bps	-25.25	-18.50	+674bps	-26.34	-18.09	+825bps
ASSET-LIABILITY/BALANCE SHEET METRICS									
Net asset volatility (%)	7.35	5.60	-175bps	7.53	6.69	-84bps	9.91	6.42	-349bps
Hedge ratio (%)	40.0	62.1	+22%				28.9	59.5	+31%
Net asset VaR95 (\$mn)	546	376	-\$170mn				321	221	-\$99mn
Worst A/L ratio return (%)	-33.17	-26.98	+619bps				-20.60	-14.54	+607bps
DCOH volatility (days)	16	12	-4 days						
Worst-quarter DCOH (days)	228	235	+7 days						

Source: J.P. Morgan Asset Management. Small allocations are not labeled and numbers are rounded. Green numeral indicates positive characteristics (e.g., higher return, lower volatility); red indicates negative characteristics.

An optimized solution reduces risk while boosting return

EXHIBIT 8A: FIVE WORST QUARTERS OF MARKET-SENSITIVE NET ASSET CHANGES – CURRENT VS. OPTIMIZED PORTFOLIOS



WORST QUARTERS RETURN (%)

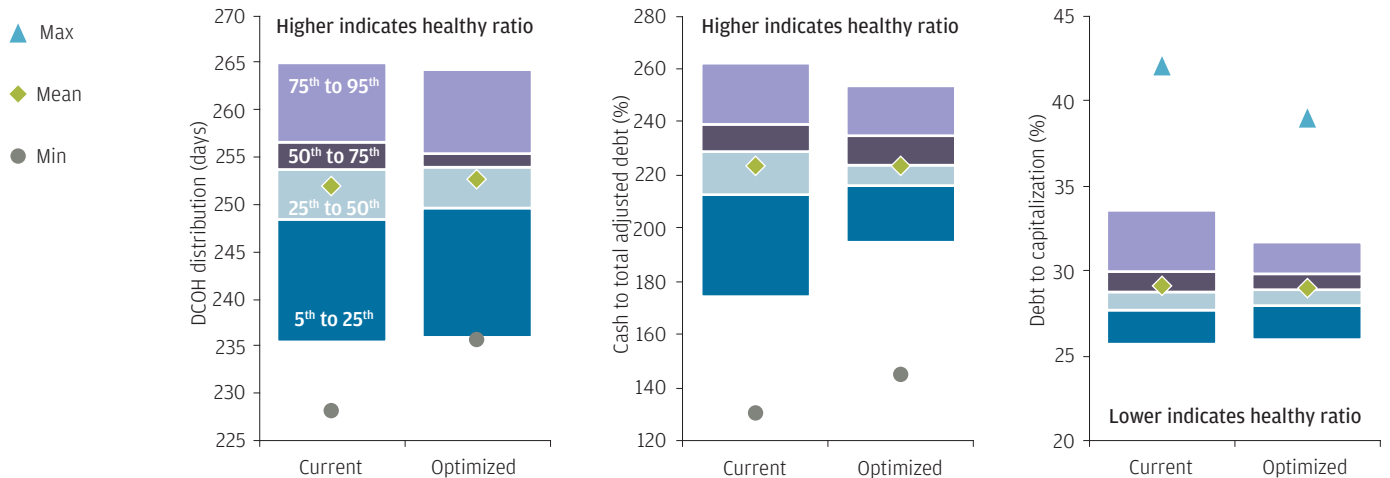
	Q4/2008	Q3/2011	Q2/2010	Q3/2015	Q2/2012
Current	-8.50	-4.91	-3.15	-3.24	-0.85
Optimized	-3.63	0.56	1.09	-0.80	1.18
Liability	17.59	9.27	7.38	2.92	5.92

- Public equity allocations across pools are smaller, with reduced home bias and a preference for international equities.
- Hedge funds provide volatility-dampening equity diversification, which helps boost downside DCOH metrics.
- The illiquid budget is maximized to capture the return premium over public markets and diversification benefits.

In general, portfolios reduce risk in the long-term investment pool by replacing a portion of the public equity allocation with lower volatility fixed income and diversifying alternatives, leading to improvements in both DCOH volatility and worst-quarter DCOH. Within the DB pension portfolio, core fixed income is extended to include a combination of STRIPS, long Treasuries and long credit, which help increase the hedge ratio and reduce surplus volatility.

An optimized solution reduces the variability of key operating metrics and improves downside scenario outcomes

EXHIBIT 8B: KEY OPERATING METRICS DISTRIBUTION – CURRENT VS. OPTIMIZED PORTFOLIOS



Source: J.P. Morgan Asset Management. For illustrative purposes only.

At this juncture, we switch from a forward-looking simulation of risks to a historical stress test of the asset allocation solution. Our goal: to demonstrate how market fluctuations would have impacted market-sensitive net assets and key operating metrics.

EXHIBIT 8A shows the net asset value drawdown over the worst five quarters. Due to a higher pension hedge ratio (better liability matching) and a less risky investment allocation, the optimized portfolio significantly outperforms the current portfolio, improving net asset value changes by ~25% in Q4/2008. The optimized portfolio also reduces the variability of key operating metrics, illustrated in **EXHIBIT 8B**. Maintaining key operating metrics within tolerable ranges is important given the link between a health care system's debt rating and the overall health of its underlying business.

CONCLUSION

Health care organizations have multiple asset pools, each with its own specific objectives, constraints and risk tolerances. In aggregate, these pools impact an organization's financial flexibility to achieve enterprise-level objectives. We have outlined a flexible asset allocation framework that reflects the unique characteristics of each pool. Most importantly, it is a holistic approach that optimizes portfolio construction across asset pools for both diversification benefits and maximum enterprise-level financial impact.

Appendix: Terminology

Asset (expected) volatility: Calculated based on J.P. Morgan Asset Management's Long-Term Capital Market Assumptions (12 years of historical index data from Q3/2006-Q2/2018), with few adjustments. We used accounting volatility for illiquid assets.

Cash to total adjusted debt: Measures financial leverage. Reflects the ability of a health care entity to repay bondholders from unrestricted cash and investments. A higher number indicates financial reserves to cover obligations (and thus a stronger credit). Total adjusted debt includes short- and long-term debt, as well as net pension liability.

Days cash on hand (DCOH): Measures the number of days a health care entity could continue to fund operating expenses from existing unrestricted cash and investments in the absence of cash flow, assuming equal daily expenditures. A higher number of days indicates credit positive, greater financial stability and an ability to withstand disruption. $DCOH = \text{Unrestricted funds} \times 365 / (\text{Operating expense} - \text{Depreciation and amortization})$.

Unrestricted funds (unrestricted cash and investments): Include cash and unrestricted portion of the investment's assets. Fluctuation of this portion of the assets may have a positive/ negative impact on key operating metrics.

DCOH historical volatility (annualized, in days): Calculated based on DCOH changes using 48 quarters of historical portfolio returns from Q3/2006-Q2/2018. We assume each quarter as an independent event with the same initial DCOH value. This metric is annualized by multiplying the standard deviation of the quarterly DCOH changes by the square root of 4; the result is then multiplied by the initial DCOH value (in days).

Debt to capitalization: Measures financial leverage. Reflects the way in which a health care entity finances its operations (through debt or equity). A higher ratio may show weak financial strength because the cost of debt may increase the entity's default risk. Capitalization includes total debt and unrestricted net assets. Debt includes short- and long-term debt.

Expected income: Income for fixed income assets is the yield to worst. For other assets, income is the dividend yield. Income data as of December 31, 2018.

Expected (arithmetic) return: Calculated based on J.P. Morgan Asset Management's 2019 Long-Term Capital Market Assumptions.

Hedge ratio: A main driver of net asset (surplus) risk and measurement of portfolio interest rate sensitivity relative to liabilities. The hedge ratio is calculated by dividing the dollar duration of assets by the dollar duration of liabilities.

Max drawdown: Maximum percentage loss of a portfolio, calculated from peak to trough, before a new peak is attained, based on stress-testing historical quarterly asset return for the 48 quarters from Q3/2006–Q2/2018. Shown as percentage of the peak and assumes quarterly rebalancing.

Net asset VaR95 (value at risk): Measures total enterprise market-sensitive net asset at the 95th percentile based on factor-based asset and liability return simulations. Net asset VaR95 means that there is a 5% probability that the net asset will underperform by more than the net asset VaR value over a one-year period.

Net asset volatility: Measures total enterprise market-sensitive net asset volatility; the tracking error of a pool's assets and liabilities, similar to the surplus volatility metric commonly used to measure pension funded status risk. The market-sensitive net asset volatility in the case study includes pension assets and liabilities, long-term and short-term investments, and fixed and variable rate debt.

Sharpe ratio: Return per unit of risk, calculated based on long-term cash rate/risk-free rate of 2%.

Total duration: Measures asset pool sensitivity to a change in the interest rate. Approximate percentage by which assets' market value will change if the yield changes by 100 basis points.

World equity beta: Calculated based on regression of 12 years of historical quarterly portfolio return, using the return of the AC World Equity from Q3/2006–Q2/2018.

Worst A/L return: Worst asset/liability (or funded status) return: Based on stress-testing historical quarterly asset and liability return for the 48 quarters from Q3/2006–Q2/2018.

Worst-quarter DCOH: Calculated based on stress-testing historical quarterly asset return for the 48 quarters from Q3/2006–Q2/2018. This is shown as the ending DCOH in unit of days.

Worst-quarter return: Calculated based on stress-testing historical quarterly asset return for the 48 quarters from Q3/2006–Q2/2018.

PORTFOLIO INSIGHTS

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