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Theory suggests that routine rebalancing can help maintain a portfolio's optimal allocation. But, in the current environment of unprecedented market turmoil and shifting dynamics, strict adherence to this practiced discipline might not be the most appropriate risk management response.

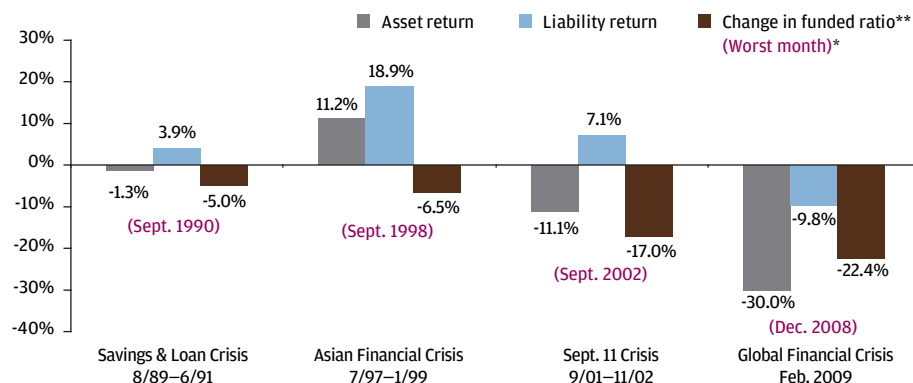
As a result of the current market crisis, funded status for most pension plans deteriorated beyond the extent experienced in past crises (**Exhibit 1**). These plans also saw their portfolio allocations shift dramatically, transaction costs increase, liquidity evaporate and assumptions about asset class returns, risks and correlations seriously challenged. At the same time, sponsoring institutions are faced with managing the broader effects of the credit crisis and economic downturn on their businesses

and workforce—all within the context of a stricter pension regulatory environment. For some sponsors, these changes have had a substantive impact on their level of risk tolerance and perhaps even their fundamental view of risk. In this instance, the question is not just *when* to rebalance, but *what* to rebalance to.

This *Insights* paper looks at the rebalancing decision from the perspective of today's plan sponsor who is challenged with managing investment decisions in an extremely uncertain environment.

EXHIBIT 1: PENSION FUND PERFORMANCE HAS SUFFERED EVEN MORE THAN IN PAST CRISES

Performance from start of the crisis until worst month for funded ratio*



Source: J.P. Morgan Asset Management, Datastream, HFRI

* Worst month defined as month in which lowest funded ratio across the crisis analyzed occurs.

** Liabilities calculated using 11 yr duration fixed income instrument and assumes service cost = benefit payments. Asset allocations correspond to a typical corporate pension plan as of 12/31/07 (Source: *Next Generation Alternative Investing Survey*, J.P. Morgan Asset Management, July 2008). However, note that it excludes EMD and that alternatives are proxied with the HFRI Fund of Funds Diversified Index (allocation: 8.9%), and a real estate index (NCREIF) (allocation: 4.0%); 1Q:09 real estate estimates from J.P. Morgan Asset Management Global Real Assets.

Beyond Rebalancing: Rethinking long-term asset allocation

In doing so, it examines key considerations—for both the long and the short term—that we believe defined benefit plans must weigh as they address rebalancing decisions:

- **Implementation issues**—Rebalancing now can be costly and further reduce portfolio liquidity.
- **Market volatility and portfolio risk considerations**—A portfolio's current volatility may be more in line with strategic risk limits than if the portfolio were rebalanced.
- **Longer-term considerations**—In a changing risk/return and regulatory environment, rethinking the strategic asset allocation and risk management approach may be warranted.

What we do not do in this paper is address tactical rebalancing issues—recommending under- or over-weighting sectors or markets,¹ or the most opportune time to rebalance from a return perspective. Rather, our focus is on helping investors think through the rebalancing decision while being aware of key considerations and trade-offs, with the goal of managing and minimizing risk.

Implementation Issues: Asset Allocation and the Illiquidity Trap

Arguably, one of the most distressing impacts of the current crisis for defined benefit plans has been on their access to liquidity. Not only have portfolio values declined precipitously, assets have also become far more costly to liquidate. Additionally, potential cash flows from liquidation are not only smaller but, given increased market volatility, also less certain—making the management of cash flows to meet benefit payments increasingly difficult. As a result, many plan sponsors considering rebalancing find themselves in an “illiquidity trap.” Theoretically, rebalancing seems like the right thing to do, but it is costly and may further reduce a portfolio's liquidity.

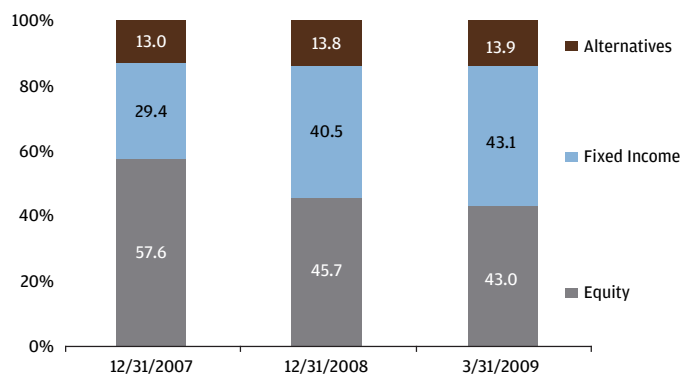
The following discussion draws key implications for the rebalancing decision, illustrating and quantifying the impact of the current crisis on the components of portfolio liquidity (market value, liquidation costs and volatility).

Impact of the current crisis on the components of portfolio liquidity

Over the course of the credit crisis, we estimate that the **market value** for a typical pension portfolio declined by approximately 28%. Fixed income allocations, traditionally the source of liquidity, grew as other asset classes became stressed, turning the average pension portfolio allocation to traditional assets from 58% equity/29% fixed income at year-end 2007 to 43% equity/43% fixed income on 03/31/09, while alternative allocations remained relatively flat (**Exhibit 2**).

EXHIBIT 2: ASSET ALLOCATIONS HAVE EXPERIENCED A MAJOR SHIFT TOWARD FIXED INCOME

Asset allocation of a typical pension fund, prior to the crisis (12/31/07) and assuming no rebalancing at 12/31/08 and 3/31/09



Source: J.P. Morgan Asset Management, eVestments, HFRI 12/31/07 allocations correspond to a typical corporate pension fund allocation, as of 12/31/07 (Source: *Next Generation Alternative Investing Survey*, J.P. Morgan Asset Management, July, 2008). However, note that it excludes EMD and that alternatives are proxied with an HFRI Fund of Fund Diversified index (allocation: 8.9%), and J.P. Morgan Asset Management—Global Real Assets estimates for real estate (allocation: 4.0%). Allocation shifts result solely from the mark to market of investments, not from rebalancing nor cash inflows/outflows.

At the same time, **liquidation costs** increased, most dramatically for fixed income. As 2008 progressed, portfolios with fixed income exposure became increasingly illiquid—particularly those with exposure to corporate bonds, non-agency mortgages or structured credit. By the end of 2008, with practically no trading taking place, we estimate the liquidation of a portfolio benchmarked to the Barclays Capital U.S. Aggregate Index could have cost as much as 7% of its value, compared to negligible costs about two years ago.² This severely hampered the ability of fixed income allocations to serve as a source of liquidity—whether for pension payments, rebalancing, collateral/margin calls associated with derivative positions, or for capital calls linked to alternative investments.

¹ For investment insights from our Global Multi-Asset Group (GMAG), see the monthly *GMAG INSIGHT SERIES-Monthly Investment Outlook*.

² J.P. Morgan Asset Management estimate.

Exhibit 3 shows our estimates of liquidation costs (to be used in the analysis below), highlighting the much greater cost increases for fixed income. These are rough estimates as liquidation costs vary significantly over time and typically depend on the securities sold and the size of the transaction. Here, what is important is the fact that these costs have increased considerably since 2007, and even though liquidity conditions have improved, they remain high.

EXHIBIT 3: LIQUIDATION COST ESTIMATES³

	12/31/07	03/31/09
Equity	0.5%	1.0%
Fixed income	-N/M-	2.0%
Alternatives	50.0%	60.0%

Source: J.P. Morgan Asset Management

The same period also witnessed unprecedented increases in **volatility** across asset classes, with equities experiencing the most extreme escalation. **Exhibit 4** illustrates this dramatic increase by comparing the 1-year standard deviation as of year-end 2007 with that of today.

EXHIBIT 4: ONE-YEAR STANDARD DEVIATIONS

	12/31/07	03/31/09
Equity	16.0%	44.2%
Fixed income	3.5%	5.6%
Alternatives	9.0%	12.2%

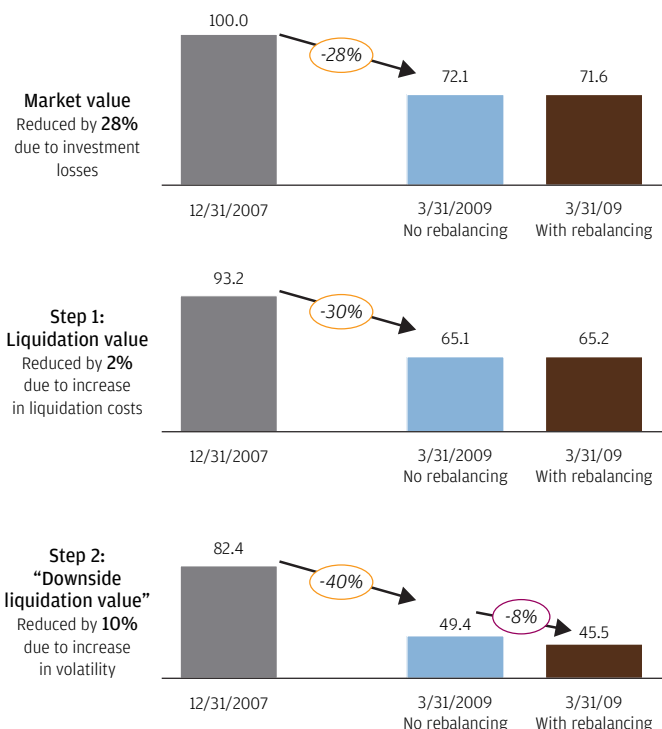
Source: J.P. Morgan Asset Management, based on 12 months of daily returns. The alternatives volatility for 12/31/07 is based on J.P. Morgan Asset Management's long-term capital market return assumptions for funds of hedge funds. It has been increased by 36% to reflect the higher volatility experienced in 2008 and early 2009.

This extreme increase in volatility raises a liquidity management challenge; it reduces the certainty of the cash amount one can expect to obtain upon liquidation of a portfolio in the near term.

A rebalancing decision can put a drag on liquidity

To incorporate the impact on liquidity of each of these components—market value, liquidation costs and volatility—we use a two-step approach (**Exhibit 5**). Employing the above asset allocations and liquidation costs, we first identify a portfolio's liquidation value, i.e. the cash generated should all its assets be sold immediately. We then estimate the portfolio's theoretical "downside liquidation value," the liquidation value less a "downside haircut." This "downside haircut" (defined by the standard deviations listed in **Exhibit 4**), accounts for the possibility of having to liquidate assets at significant discounts due to volatility.

EXHIBIT 5: ASSESSING THE "DOWNSIDE LIQUIDATION VALUE" OF A PORTFOLIO AT DIFFERENT POINTS IN TIME



Source: J.P. Morgan Asset Management, Datastream. Analysis as of 3/31/09.

Step 1: Assessing the liquidation value—liquidation costs reduce liquidity by 2%, on top of investment losses

Given market movements, a typical pension fund would have lost 28% of its market value (\$100 vs. \$72.1) between 12/31/07 and 03/31/09. But, on a liquidation value basis, the portfolio would have lost 30% (\$93.2 vs. \$65.1), 2% more than the market value loss, as a result of liquidation costs. If the pension fund had rebalanced back to its pre-crisis allocation, the liquidation value would not have been significantly affected. However, rebalancing will have an impact when volatility is incorporated into the analysis.

Step 2: Given higher volatility, rebalancing reduces "downside liquidation value" by 8%

Next, we apply our theoretical "downside haircut" to the liquidation values obtained in Step 1 in order to quantify the greater downside potential due to recent increases in volatility. Pre-crisis, we estimate that the "haircut" reduces the liquidation value by just under 11.6% (\$93.2 to \$82.4). However, in the current environment, this downside cost is even greater, reducing the liquidation value by almost 24% (\$65.1 to \$49.4).

³ Liquidation costs are defined as the costs an investor would incur should a portfolio be fully and immediately liquidated. Beyond commissions, these costs incorporate an "illiquidity" discount that would reduce the value of an illiquid portfolio when sold with urgency. For example, alternative assets, often structured with lock-ups, would bear high discounts if monetized right away. Similarly, selling some fixed income instruments has proven to be challenging in the current environment, due to their illiquidity.

Beyond Rebalancing: Rethinking long-term asset allocation

Starting with the initial 28% loss in market value, plus the 2% loss in liquidation costs from Step 1, the potential liquidity loss increases to 40% when downside volatility is accounted for.

Furthermore, with volatility incorporated in the analysis, rebalancing the portfolio back to its pre-crisis allocation reduces “downside liquidation value” by an additional 8%, a result of the increased allocation to equity.

This final step demonstrates that rebalancing out of fixed income into equity today can be costly and will reduce the confidence an investor can have in the value of cash flows generated by liquidating portfolio assets. This has clear implications for liquidity planning; while pension funds can usually predict their benefit payments with accuracy over the short term, the capacity to identify in advance where the required liquidity will come from has become particularly challenging. While equity has surprisingly become a preferred liquidity source, its extreme volatility makes it a potentially deceitful ally in the battle for liquidity. Today, depending on the plan’s specific circumstances, it may seem more reasonable to hold off on rebalancing until liquidation costs and volatility come back to more normal levels.

Portfolio Impact of Increased Volatility: Today’s 30/70 = Yesterday’s 60/40⁴

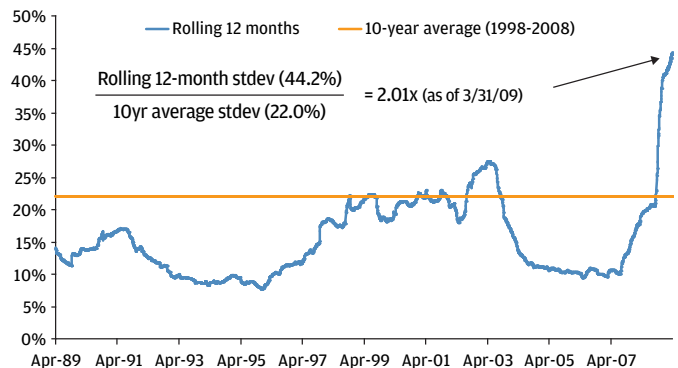
When establishing a long-term strategic normal allocation, pension funds typically use long-term averages for the return and volatility expectations of their potential investments. It is of course understood that these long-term averages should be broadly consistent with historically realized asset performance. It is also clear that in the short term, markets can and will deviate from these longer-term estimates. However, in the current environment, we are witnessing a deviation so extreme that the validity of assessing portfolio risk on the basis of historical volatility has become seriously challenged.

As seen in **Exhibit 6**, equity risk is now more than twice its long-term average, while fixed income risk has increased to a slightly less pronounced 1.4 times its long-term average.

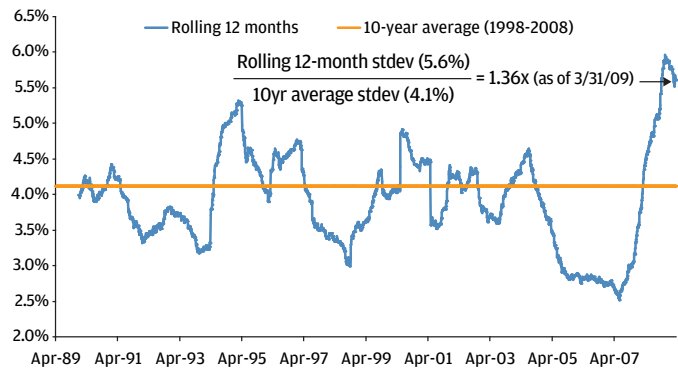
As illustrated in **Exhibit 7**, a typical “pre-crisis” portfolio allocation (60% equity/40% fixed income) has a volatility of **13.0%** based on 10 years of data, but a volatility of **26.3%** using the past 12 months—almost double the longer-term estimate.

EXHIBIT 6: UNPRECEDENTED CHANGES IN VOLATILITY

S&P 500: Rolling 12-month standard deviation, based on daily returns



Barclays Capital U.S. Aggregate: Rolling 12-month standard deviation, based on daily returns



Source: J.P. Morgan Asset Management, Datastream. Analysis as of 3/31/09.

Further, a 30% equity/70% fixed income portfolio in the current environment has an estimated volatility of **13.2%** based on the past 12 months—in line with the long-term risk of a 60% equity/40% fixed income portfolio prior to the crisis.

Loosely speaking, this simplistic example suggests that rebalancing a 30/70 portfolio towards a pre-crisis strategic norm would roughly double its overall risk exposure in the current environment, while

EXHIBIT 7: COMPARISON OF PORTFOLIO RISK, BASED ON LONG-TERM AND SHORT-TERM DATA

	Allocation				
	S&P 500: 70%	60%	50%	40%	30%
Barclays Capital U.S. Aggregate:	30%	40%	50%	60%	70%
Yearly standard deviation					
Based on 10yr history	15.2%	13.0%	10.7%	8.7%	6.7%
Based on 1yr history	30.8%	26.3%	21.7%	17.4%	13.2%

Source: J.P. Morgan Asset Management, Datastream. Analysis as of 3/31/09.

⁴ A 30% equity/70% fixed income portfolio today has volatility similar to that of a 60% equity/40% fixed income portfolio prior to the current crisis.

maintaining the current allocation would keep its risk exposure at the level pension plans were presumably comfortable with when deciding on their long-term, pre-crisis strategic allocation.

Delaying rebalancing—a risk management decision

Theoretically, adhering to rebalancing procedures is viewed as an appropriate way to manage risk,⁵ whereas choosing to deviate from set guidelines depending on certain market conditions could be viewed as market timing.

However, in today’s intensely volatile environment, the decision to rebalance would require an extremely strong conviction in a robust equity rebound to justify taking on the abnormally high risk. This “bet” could potentially double portfolio volatility to levels far above strategic targets. On the other hand, a decision to delay rebalancing would maintain risk near strategic levels and could, contrary to what theory might suggest, be a true risk management decision.

But, more fundamentally, beyond the impact of current market dislocations on the timing of rebalancing, the more critical question is—**what should the portfolio be rebalanced to**, keeping in mind both sides of the balance sheet—pension assets *and* liabilities?

Longer-Term Issues: Rethinking the Strategic Asset Allocation

Why this is an opportune time for an asset/liability study

When some or all of the key factors that drove the current strategic asset allocation decision have materially changed, the time is right to conduct a new asset/liability study.

In fact, for many investors the majority of these driving factors have changed considerably—not just at the broad market level, but at the individual plan level as well—in different ways and to varying degrees. Only by evaluating these changes, and in particular, their impact on the sponsor’s view of risk and tolerance for it, can a strategic asset allocation be established that is pertinent to the plan’s current circumstances and future objectives.

Exhibit 8 offers a starting point for assessing the need for a new strategic asset allocation, highlighting each of the key factors addressed in an asset/liability study. We anticipate that most

EXHIBIT 8: MOST KEY FACTORS DRIVING AN ASSET/LIABILITY MANAGEMENT STUDY HAVE CHANGED



Source: J.P. Morgan Asset Management.

sponsors who consider this list will find that prior perspectives have come into question as a result of the current crisis:

- **Plan liability profile**
Workforce (or benefit) reductions due to recessionary pressures can alter the liability profile, particularly when, for example, early retirement packages are offered and lump sums are paid out upon participant departure. Many sponsors have made decisions to close or freeze their defined benefit pension plans, also altering the liabilities.
- **Capital market expectations**
J.P. Morgan Asset Management’s Long-Term Capital Market Return Assumptions were adjusted this year to reflect a higher potential gain as markets return to more normal levels. In parallel, our assumptions take into account the conviction that volatilities will remain at higher levels than in the past.⁶ Additionally, our on-going research suggests that the understanding of downside risk might be improved by models that more clearly account for the non-normality of investment returns, which can have a significant impact on asset allocation decisions.⁷ Perspectives on future inflation and interest rates may also be substantially altered given the financial crisis and the fiscal and monetary policy reactions to it.
- **Regulatory and accounting framework⁸**
Rules and regulations governing pension plans will of course differ by type of plan. In 2006, new funding and accounting

⁵ For a review of the benefits of rebalancing, see *Optimal portfolio rebalancing strategy*, J.P. Morgan Asset Management, 2003.

⁶ For example, J.P. Morgan Asset Management’s long-term capital market return assumption for U.S. Large Cap equity was increased by 100bps, from 8.00% (as of 11/30/07) to 9.00% (as of 11/30/08). Volatility estimates, which have typically been based on trailing 10-year averages, were increased by 15% to 25% across asset classes. This reflects higher expected future volatility that would not be captured by the historical data.

⁷ Our recent white paper, *Non-normality of market returns* (J.P. Morgan Asset Management, May 2009), presents our latest research on this topic.

⁸ See Appendix A for additional details on regulatory changes. Also visit jpmorgan.com/pages/jpmorgan/am/cbs for updates and insights on pension regulation and accounting topics from J.P. Morgan Asset Management—Compensation and Benefit Strategies.

regulations for corporate plans (the Pension Protection Act (PPA) governing plan contributions and benefits, and FASB 158 accounting rule changes which put pension funded status on corporate balance sheets) represented one of the most significant series of changes corporate plan sponsors had seen in over three decades. However, the current crisis is the first time these regulations are being tested in a difficult funding environment. Depending on the plan's funded status, these changes can significantly impact plan benefits and contributions as well as corporate financial statements and are reducing sponsors' capacity to tolerate portfolio volatility.

- **Plan funded status**

The degree of deterioration in funded status, in combination with PPA and FASB 158, is perhaps the most crucial determinant of the decline in risk tolerance and renewed focus on downside risk for a corporate plan sponsor.

Given PPA funding targets and "at risk" levels, a plan that was fully funded in 2007 and experienced a 20% deterioration in funded status from a U.S. GAAP perspective, is likely to face a significant decrease in PPA funded status as well.⁹ As clarified in Appendix A, a consequence of PPA is that under-funded plans are likely to have a greater aversion to downside risk than fully funded plans; from a contribution perspective, every lost dollar is penalized and will result in additional contributions. From a benefits perspective, if the PPA funded ratio goes below 80% (or 75% by end of 2009), benefits offered will be restricted with an impact on executive deferred compensation. If the funded ratio falls below 60%, among other penalties, plan freezes become reality.

- **Sponsor circumstances/Size of plan**

Increasing contribution requirements under PPA appear to be putting added pressure on operating cash flows already strained by the current crisis. At the same time, U.S. GAAP changes imply that an increase in pension deficits will have a direct impact on corporate balance sheets. As a result, corporate treasurers, already engaged in reducing debt and improving balance sheet ratios in the current environment, are further challenged by soaring pension deficits over which they do not have full control. Clearly, pension plans are becoming a more important risk concern for treasurers, as expanding deficits are likely to represent a growing proportion of corporate financial debt.

Revisiting the need for liability-aware strategies

For a plan sponsor choosing to undertake an asset/liability study, it is difficult to say what a revised strategic asset allocation will look like or how it will differ from the current policy portfolio. Circumstances unique to each plan sponsor will shape the final solution. However, given greater market volatility, lower funded ratios and more severe consequences for falling below funding targets, it is likely that sponsors and pension funds in general now have a lower tolerance for downside risk. Not long ago, putting increased volatility aside and targeting a higher asset return was an answer to closing a funding gap. Today, regulatory changes add a layer of complexity. Further deterioration of funded status may have a direct impact on the sponsor's balance sheet and cash flows as well as on the benefits offered to plan participants.

Therefore, it might be prudent to give "liability-aware" investing strategies a second glance—strategies designed to reduce the volatility of funded status by managing asset/liability mismatches. In doing so, plan sponsors should keep the lessons of 2008 in mind:

- **Asset/liability matching involves managing interest rate duration as well as credit duration exposure.** As seen in Exhibit 9, up until 2008, Treasury yields, high quality credit yields and pension liability discount rates were broadly aligned. Managing the fixed income asset/liability mismatch involved mainly extending the duration of those assets. However in 2008, rates diverged dramatically.

While long-term Treasury rates decreased by 146bps over 2008,¹⁰ high quality corporate bond rates, used to discount pension liabilities, rose as credit spreads widened by 186bps.¹¹ As a result, pension liabilities remained virtually flat over 2008, while non-credit related fixed income instruments outperformed significantly over the same period.

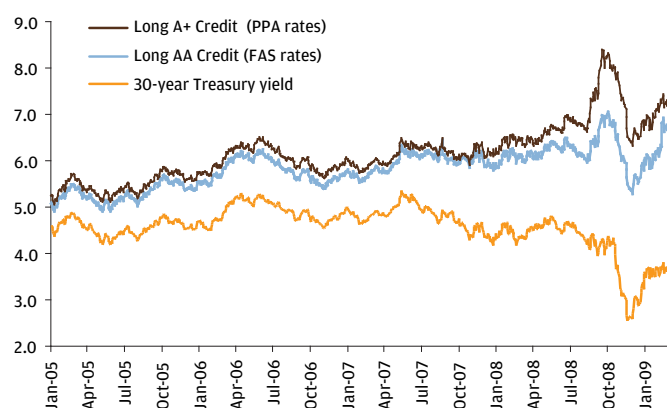
A pure interest rate duration-matching strategy using Treasuries and futures (or to an even greater extent, swaps), would have generated extremely good returns over 2008. But the limitations of these strategies became obvious given the extreme divergence in behavior of assets and liabilities. This is why credit duration exposure (the extent to which a change in spreads may have a different impact on liabilities than on assets) must be carefully managed as well, to control the volatility of funded status.

⁹ Note that some of the provisions for relief introduced in 2008 and 2009 will have a positive impact on the funded ratio and contributions; they allow pension funds to reduce their target funding levels and give them more freedom in choosing the discount rates they will use to value liabilities.

¹⁰ Barclays Capital Long Treasury Index.

¹¹ J.P. Morgan Aa Curve, 15-year duration.

EXHIBIT 9: DIVERGENCE IN YIELDS OVER 2008, DUE TO CREDIT SPREAD WIDENING (%)



Source: J.P. Morgan Asset Management, Barclays Capital; as of 03/31/09.

- **There is a real risk that spread widening trends will reverse in coming quarters.** Credit spreads, at their highest levels toward year-end 2008, could, as they return to more normal levels, result in a significant reduction in discount rates. This would have a dramatic impact on liability valuation. A 100bps reduction in credit spreads would imply an increase in liabilities of 10% to 15%¹² (assuming long Treasuries remain flat)—and such a reduction would still leave spreads above their 10-year average levels. In such a scenario, a pure interest-duration matching strategy using only non-credit instruments would perform poorly; the use of long duration credit however, should provide a better hedge.
- **There are no perfect instruments for hedging funded ratio risk.** The ideal instrument for managing funded ratio risk would be an asset that could mimic the response of liabilities to changes in discount rates. Treasuries and derivatives have the benefit of being very liquid, but are not effective in managing credit duration risk. Long duration credit instruments can do a better job of mitigating credit duration risk, but even within AA-rated credits, spreads can vary significantly—and these instruments are in short supply (the total amount of long duration credit is close to \$500 billion¹³ compared to \$2 trillion of pension liabilities) with significant liquidity problems today. Furthermore, any credit portfolio will experience the effects of downgrades and defaults. Pension liabilities do not experience comparable losses. Suffice it to say, replicating the liability behavior on the asset side is a complicated and

imprecise task. Even on the narrow attribute of discount rate sensitivity, liability-aware strategies require a varied arsenal of tools—as well as a high degree of “alert supervision.”

Conclusion

The current credit crisis has brought unprecedented change and unique challenges for defined benefit pension plans. In past crises, the appropriate response for some investors might have been one of rapid rebalancing to an unchanged strategic asset allocation. This time, however, the acute illiquidity, exceptionally high liquidation costs and more importantly, the extreme volatility that investors are facing suggest that for some, holding off on rebalancing might be more sensible. Additionally, it is important to recognize that this decision to delay rebalancing would truly be a risk management decision—not a market timing call.

Whether rebalancing now or in the future, the choice of what to rebalance to is critical. In our view, it would be a missed opportunity for investors not to carefully reconsider their long-term strategic allocation target today; so much has changed in 2008.

We believe that one key evolution in the mindset of investors will be their understanding of and focus on risk, given: (1) their extreme losses, (2) regulations that discourage additional exposure to potential downside risk and (3) deterioration in pension funded status at an adverse time for sponsors. Therefore, reconsidering “liability-aware” strategies, which aim at reducing the volatility of funded ratios, hence the risk of pension plans, seems very timely. But like all things, these strategies too have changed significantly over the last several months as the appreciation of their complexity has increased.

Of course, once the investor has re-established a long-term strategic norm, and assuming that this new target is different from the portfolio allocation at that point in time, the question will remain—“Is now the right time to rebalance?”

We believe that a key to answering that question lies in the assumptions (e.g. volatility, liquidity...) used in building the new asset liability model. If market levels are in line with these assumptions, there is unlikely to be a “risk management” reason to delay rebalancing. However, if market levels differ significantly from those long-term views, then perhaps a gradual rebalancing plan will be appropriate to control portfolio volatility. Only time will tell, but 2009 is undoubtedly well on its way to being another challenging year for pension fund CIOs.

¹² Assumes a duration for the liabilities of 10 to 15 years.

¹³ Size of the Long component of the Barclays Capital U.S. Aggregate Index, as of 4/29/09.

Appendix A: The Pension Protection Act (PPA) and Funded Ratios

EXHIBIT A: SUMMARY OF THE IMPACT OF THE FUNDED RATIO ON CONTRIBUTIONS AND BENEFITS ONCE PPA IS FULLY IMPLEMENTED (JANUARY 1, 2011)

Funded ratio	Contribution impact	Benefit impact
	Based on current year funding	Based on previous year funding
Funded ratio above 120%	Surplus above 120% can be used for OPEB benefits	No rules on benefits offered
Funded ratio between 100% and 120%	Normal pension cost and flat PBGC premium are due	
Funded ratio between 80% and 100%	Contributions are required to get funding to 100% over 7 years	Limited benefit restrictions kick in
Funded ratio between 60% and 80%		Significant benefit restrictions (Plan frozen)
Funded ratio below 60%	PBGC premium is increased by 0.9% of funding gap If funded ratio is under 80%, added contributions are to be expected	

Source: J.P. Morgan Asset Management, PPA. The above chart is for illustrative purposes only.

IMPACT OF THE FUNDED RATIO ON CONTRIBUTIONS

- Plans are required to amortize all shortfalls below 100% funding by January 1, 2011. A phase-in of this requirement began on January 1, 2008 with a funding target set at 92%, increasing each year until reaching 100% in 2011. Going forward, by January 1, 2010 plans with funding below 96% will face contribution requirements.
 - Should the plan benefit from a pre-funding balance and / or carryover balance, these can be offset against future contributions. This will have no impact on the total cash to be contributed into the plan, but will push the funding to a later stage, once all balances have been depleted.

IMPACT OF THE FUNDED RATIO ON BENEFITS:

- A low funded ratio will result in the incapacity of the plan to offer certain benefits:
 - Less than 80%:
 - Restriction on improving benefits
 - Restriction on lump sum payments
 - Less than 60%:
 - Freeze on benefit accruals
 - Inability to pay plant shutdown benefits
 - Restriction on all lump sum payments
- A plan is determined to be “at-risk” in the current year if the funded status in the prior year was:
 - Less than 70% based on conservative assumptions, or...
 - Less than 80% based on standard assumptions.
- Once “at-risk,” penalties are incurred:
 - Liabilities are measured using more conservative assumptions, increasing funding requirements. However the increase in liabilities is phased in at 20% per consecutive year in which the plan is “at-risk,” reducing the impact.
 - In addition, if the fund is “at-risk” repeatedly (over 2 of the last 4 years), the funding target will increase by \$700 per participant and an additional 4% of the determined at-risk liability.
 - More significantly, plans that are “at-risk” face restrictions on funding nonqualified deferred compensation programs for executives.

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