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How old is your pension plan?

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Pension plan investing for corporations has evolved toward more liability-driven strategies. We expect plans to become more sophisticated with their asset-liability management and to consider the demographics of the plan population as a significant factor. In this paper, we explain why demographics have become increasingly important and what it means for pension investment strategies.

Managing pension investment risk is dependent on aligning assets and liabilities. Fixed income cash flow can be matched with predictable near-term payments. The higher more volatile returns for equities can be aligned with liabilities that grow with salary increases and inflation for as long as several decades.

By connecting assets to liabilities for each different demographic status (active, vested terminated, and retiree), return can be sought prudently and risk can be reduced effectively. This demographic-based approach can help increase benefit security and minimize financial issues for the plan sponsor.

MATCHING RETIREE PAYMENTS IS STRAIGHTFORWARD

Retiree payments are relatively predictable because the benefit amounts are already calculated and the payments will generally be made in the near- and medium-term. That means physical bonds can produce cash flows at the same time the pension payments become due. This cash flow matching may eliminate most interest rate risk. Cash will be generated when it is needed to pay benefits, and interest rate

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changes will affect the value of the assets and the future pension payments in the same way. Since a retiree liability can be matched effectively, any precise matching of the pension liability should start with the retiree payments.

MATCHING FUTURE PAYMENTS FOR CURRENT ACTIVES IS MORE COMPLEX

The obligation for active participant benefits is more complicated than retirees. Benefit amounts are not yet determined and the timing of retirement or employment termination is not known. In addition, some payments will be made well beyond 30 years, making them virtually impossible to match with bonds.

Since risk cannot be addressed as effectively with matching cash flows, it makes sense to pursue higher returns. In addition, equity (or other growth asset) returns will likely increase with economic growth and inflation, which matches the nature of these pension payments that grow with salary increases.

However, the active liability is also highly sensitive to interest rate changes because the expected payments are further in the future. The risk related to this high duration liability can be mitigated with assets that are highly sensitive to interest rates. These assets could be long-duration Treasury STRIPS or interest rate swaps or Treasury futures, for plan sponsors that are comfortable with an allocation to derivatives.

An additional consideration is whether the benefits for active employees are frozen. A fully funded frozen plan doesn't need high returns, while an open pay-related plan that intends to provide new benefits for many years may benefit from investments with good growth potential.

Note that plans with cash balance benefits are especially suited to the approach described in this paper because the special nature of the cash balance liabilities can be directly addressed with a different asset allocation.

MATCH ASSETS WITH TERMINATED PARTICIPANT PAYMENTS ALSO

The obligation for participants who have terminated employment, but haven't started receiving their benefits, has characteristics similar to both the retiree and active liabilities. These payments will be made further in the future than payments to retirees, but they are more certain in amount and timing than active payments. Generally, the duration of this obligation will be more similar to that of the active payments. However, because these participants no longer work for the company, it may be desirable to lock in the cost to a greater extent (see demographic leveraging, below).

BENEFIT CASH FLOW EXAMPLE ILLUSTRATES THE CONCEPTS

This hypothetical illustration of projected benefit payments separated by participant segment illustrates the concepts described above. A higher allocation to bonds could be used to align with the retiree cash flows while a higher allocation to equities could be used to align with the expected benefit cash flows for current actives.

By focusing on the specific segments of the liability, we have aligned return-seeking assets where their risk will have least impact and liability-hedging assets where they will be most effective. The sample portfolio has the following characteristics:

- A substantial hedge ratio of 82% (asset duration of 11.9 divided by liability duration of 14.6) which will eliminate much of the interest rate risk in the pension liability. The gap in the duration hedge, i.e. it is not 100%, is caused by taking some equity risk relative to the active and vested terminated liabilities.
- The right mix of intermediate bonds and long bonds provides a good curve match for the retiree portion of the liability. One potential disadvantage of the intermediate bond allocation, however, is that it reduces the total duration of the portfolio.

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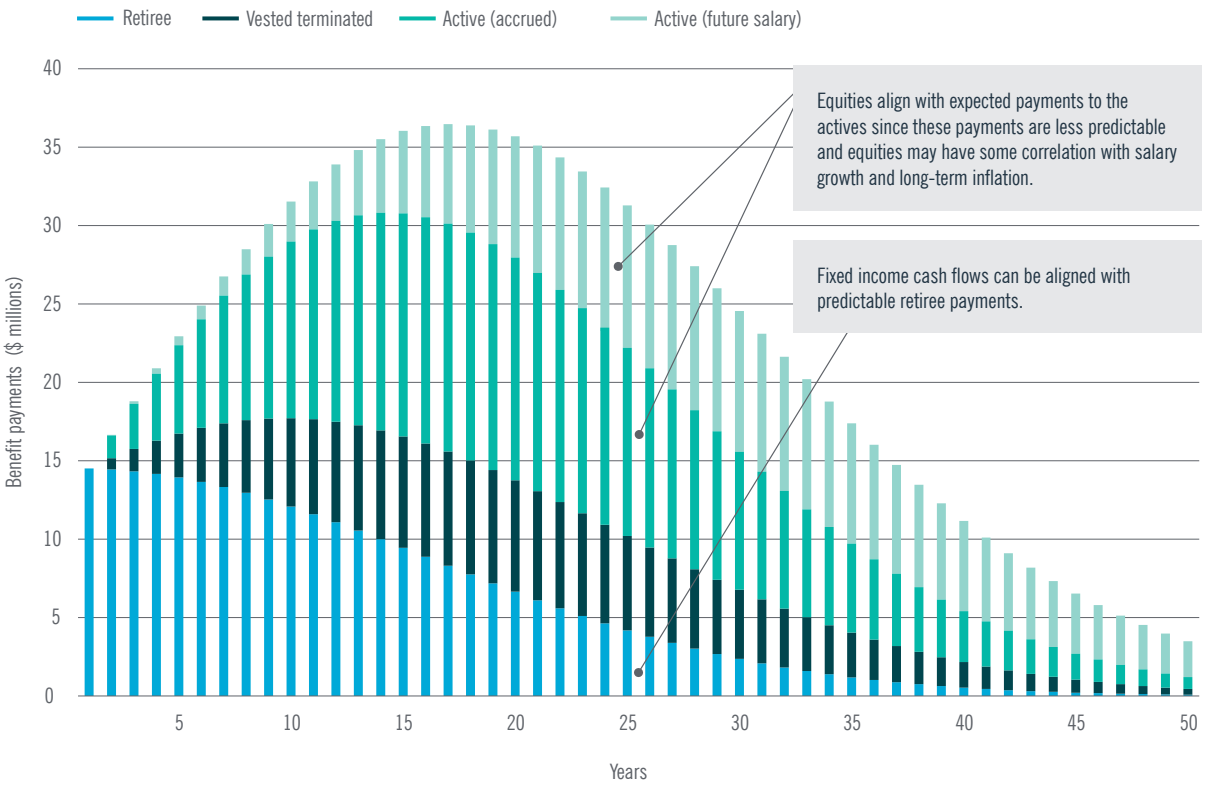
Projected payments by participant status



Hypothetical asset allocation example

The table below shows how assets could be matched with each portion of the liability:

	PLAN LIABILITY INFORMATION		PLAN ASSET INFORMATION				
	Liability ($MM)	Duration (years)	Equity ($MM)	Intermediate bonds ($MM)	Long bonds ($MM)	Long STRIPS ($MM)	Asset duration (years)
Active employees	200	17.4	100	0	0	100	13.5
Vested terminees	100	17.4	30	0	30	40	14.7
Retired participants	200	10.3	0	50	150	0	8.8
Total	**500**	**14.6**	**130**	**50**	**180**	**140**	**11.9**
Percent of assets			26%	10%	36%	28%	

Data source: Nuveen Asset Management. The plans shown in the chart and table do not currently exist and the strategy shown is for illustrative purposes only. See notes on hypothetical illustrations under important considerations at the end of this report.

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- An allocation to equities, which may help the portfolio outperform the liability, is aligned with the long-dated payments of the active liability – the most challenging to match.
- The portfolio will evolve with time as the demographics of the population change – to lower risk and a higher allocation to bonds as the plan matures.

Overall, this sample portfolio has much less asset/liability risk than the typical 60/40 asset allocation for a pension plan. However, a plan sponsor could take on more risk if desired, particularly if the pension plan is still open. For those plan sponsors who are willing to use interest rate swap overlays or other leveraged interest rate exposures, additional equity risk can be included without losing any interest rate hedging power.

DEMOGRAPHIC LEVERAGING CAUSES MOST PENSION DEFAULTS

The obligations for retirees and other former employees create financial leverage for the sponsoring organization, since a debt exists with no relation to a productive human resource asset. This demographic leveraging effect, due to the plan growing faster than the sponsors' financial resources, is the underlying cause of most pension defaults. However, if this portion of the liability is fully funded with a well-matched portfolio of assets, this potentially destructive leverage is eliminated.

LEVERAGED RISK CREATES CHALLENGING SITUATIONS

The illustration following shows how the maturity of a pension plan can create a leverage effect when assets and liabilities are not matched. In the illustration, we look at two companies with the same active employee populations, pension funding ratios and corporate revenues. The only difference between the companies is that one has a bigger retiree population. In effect, the plan is older since prior employees have earned their benefits and retired. The illustration shows the impact of a -10% return.

Since the liabilities and assets are larger for the older plan, the impact of unexpected investment losses is larger. Funding this bigger deficit from the same amount of revenue is a bigger problem. The more leveraged situation in the mature plan calls for less investment (asset-liability) risk.

Hypothetical illustration: demographic leveraging of investment risk (dollar figures in $MM)

	Young plan	Mature plan
Liability for active employees	$1,000	$1,000
Liability for retirees and terminated employees	$500	$1,500
Total liability	$1,500	$2,500
Assets	$1,350	$2,250
Funded ratio	90%	90%
Assets after -10% return	$1,215	$2,025
Deficit	**$285**	**$475**
Corporate revenue	$5,000	$5,000
Deficit as percent of corporate revenue	**5.7%**	**9.5%**

Data source: Nuveen Asset Management. The plans above do not currently exist and are hypothetical strategies for illustrative purposes only. See notes on hypothetical illustrations under important considerations at the end of this report.

NEXT STEPS

Reducing pension risk requires an understanding of how assets can be aligned with the pension liability. This is most effective when the demographic characteristics of the liability are considered. Risk and leverage can be reduced so that pension costs are more predictable and manageable.

Our experts at Nuveen Asset Management have designed and implemented these types of portfolios in recent years, and we expect to see more plan sponsors using the demographic profile of their plan to influence their asset allocation.

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