

Evaluating pension risk transfer: Is risk being transferred? Or just shuffled around?

- A pension risk transfer is the payment of assets either directly to plan participants or to a third party, such as an insurance company, to settle a set of pension liabilities.
- For the plan sponsor, the goal of the pension risk transfer is to accomplish some combination of the following: reduce the size of the pension plan (smaller asset and liability amounts), reduce the ongoing costs of the plan, and/or reduce the ongoing risks of the plan.
- The measurement of the reduction to a pension plan's cost or risk should include not just the immediate risk transfer transaction (the exchange of assets for an immediate reduction in plan liabilities) but also any effects on the costs or risks of the remaining plan.
- Some pension risk transfers may be well-intentioned but reduce neither costs nor risk for the plan sponsor once the remaining pension plan is considered. If the financial analysis does not consider the effect of ongoing service costs, IRS funding requirements, and investment strategy considerations, then more analysis is needed before committing to a pension risk transfer.

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How a typical risk transfer might be evaluated

The financial case for a pension risk transfer is that it enables a plan sponsor to reduce the size, cost, or risk of its pension plan, or achieve some combination of those goals.

The two main types of risk transfers are lump-sum payments to terminated vested participants (often through a one-time voluntary program) and the purchase of a group annuity contract from an insurance company (often for the plan's retirees). In each case, assets and liabilities of the pension plan would be reduced and the affected participants would have their benefits settled and would no longer be participants of the plan.

In this paper, we will focus on the annuity purchase because it typically produces the greater plan size reduction, but the thought process and analysis would be similar for both transfer types.¹

Reduction in the size of the pension plan

An inarguable fact is that a pension risk transfer will reduce the immediate size of the pension plan—both the assets and the liabilities. This reduction may be beneficial in and of itself (Gannon, 2021) because a smaller pension plan would often have a smaller effect on corporate financial statements.

For instance, in the ratio of liability to market capitalization—a key indicator of the influence that a pension plan's finances have on the overall organization—the liability will be smaller and, to the extent that the risk transfer does not significantly affect the market capitalization, this ratio will decline.² As a result, the pension plan's financial impact on the organization would likely be reduced.

When evaluating the benefit of decreasing the pension plan's size, sponsors should next look at the transaction's impact on the plan's cost and risk.

Reduction of cost

When a sponsor pays to remove the pension liabilities and associated costs, it is releasing assets from the plan either directly to the participant, in the case of the lump-sum option, or to an insurance company, in the case of an annuitization. Of course, a sponsor shouldn't pay just any price to transfer this liability to achieve a reduction in size, cost, and/or risk. The amount should be reasonable. So what price should it pay? What should be included in the measurement of cost when sponsors decide what price to pay to transfer the liability?

Usually, to evaluate whether a risk transfer benefits the sponsor,³ we compare:

- a) The present value (PV) of the benefits, or liability, plus the ongoing costs related to affected participants, and
- b) the amount of assets released to the insurance company plus costs paid to facilitate the transaction.

If (a) is greater than (b), then the sponsor would likely want to engage in the risk transfer because it is saving money as more liabilities and costs are released than assets. If (b) is greater than (a), then the sponsor would likely not want to engage in the transfer because it is paying more to transfer those liabilities and costs than their value.

¹ Retiree liability is typically about half the value of plan liabilities, so a full retiree annuitization can reduce the plan size by half. By comparison, terminated vested liability is typically around 15% of plan liability, and therefore a terminated vested lump-sum program may reduce the plan size by only 10%, once the fact that not everyone chooses to take part in the program is accounted for (data source: Pension Benefit Guaranty Corporation 2019 DataBook).

² An analysis (see Figure 6 in Gannon, 2021) shows that six of the 10 largest annuity purchase transactions had a liability as percentage of market capitalization greater than 45%, which placed them in the top 5th percentile of all U.S. corporate pension plans. The remaining four had a ratio greater than 15%, which would place them above the median.

³ This paper is being written from the view that a risk transfer is a "settlor function" and not a "fiduciary decision," and therefore the decision can be made from the perspective of how the transaction affects the corporation (i.e., the sponsor) rather than having to be made in the best interest of plan participants.

Other considerations for the example

Value of the liabilities. The value of the liabilities is their "market" value liability, typically the expected benefit payments discounted using a high-quality corporate bond yield curve at the time of the transfer. In **Figure 1**, the value of liabilities released will be \$250 million.

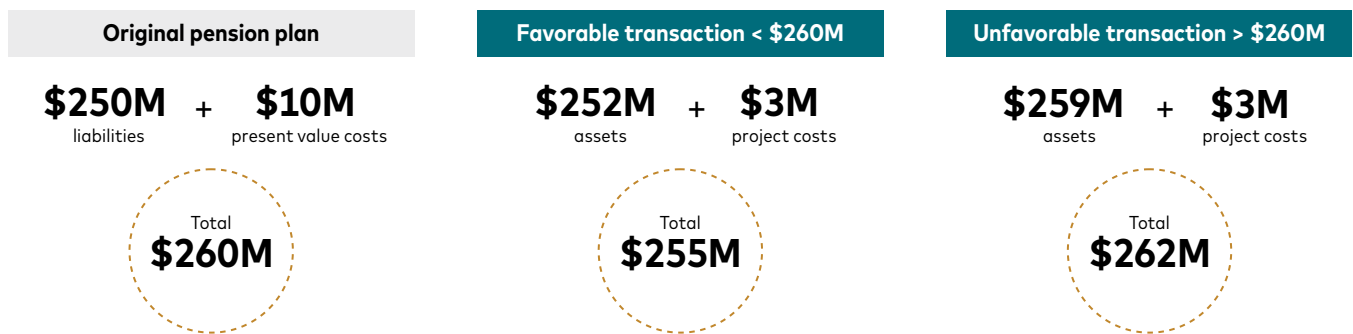
Present value of future costs saved. The reduction of cost is usually measured in terms of the value of Pension Benefit Guaranty Corporation (PBGC) premiums and other annual per-participant administrative costs eliminated. In our example, the present value of these total future costs will be \$10 million.

Direct cost of the risk transfer. The assets paid from the plan to the insurance company (or directly to the participants in the case of a lump-sum window).

Other costs and fees related to risk transfer. Any fees paid to service providers or internal time and costs to analyze and facilitate the transaction.

In our example (Figure 1), the total of pension liabilities plus costs eliminated is assumed to be \$260 million. In a "favorable" transaction, the assets transferred plus project costs would be less than \$260 million and in an "unfavorable" one, the amount would be more than \$260 million.⁴

FIGURE 1.
Comparing the assets paid with the liabilities and costs eliminated



Source: Vanguard.

⁴ It is important to understand that there may be reasons to do a risk transfer even if this math would deem it "unfavorable" and reasons not to even if the math would deem it "favorable." However, this type of analysis should be the starting point for a risk transfer decision.

Reduction of risk

The risk reduction in a pension risk transfer comes from the reduction of assets and liabilities after the transfer. A smaller pension plan will put fewer dollars at risk for the plan sponsor. **Figure 2** shows an example of a fully funded pension plan that purchases annuities for its retirees, for half its liability. Prior to the annuitization, the asset allocation is 30% in return-seeking assets⁵ and 70% in fixed income, and the plan's surplus Value at Risk (VaR)⁶ is \$45 million (see column 1).

After the annuitization (see column 2), the plan's surplus VaR has decreased to \$28 million. Notice that the assets and liabilities have been reduced by half, but the surplus VaR has not. It was reduced by 37%, from \$45 million to \$28 million.

This is because the remaining liabilities have a longer duration⁷ than the original set of liabilities, 19.3 years versus 14.7 years, and we have kept the

fixed income duration the same, 17.5 years. This longer liability duration, along with the same asset portfolio duration, decreases the plan's interest rate and credit spread hedge ratios,⁸ both key metrics for managing risk (Dutton and Wolfram, 2022). This is expected to occur after a retiree annuitization, as retirees have the shortest duration of the participant cohorts (active employees, terminated vested employees, and retirees), and therefore the remaining liabilities will have a longer duration than they had before the risk transfer.

The plan's liabilities are now lower, but their duration is longer and therefore riskier on a per-dollar basis, therefore the surplus VaR was not reduced in proportion to the plan's liabilities (i.e., cut in half). To accomplish a proportional decrease, the duration of the plan's fixed income would need to be increased, which would increase the interest rate hedge ratio (see column 3).

FIGURE 2.
Liabilities and risk reduced, but not proportionally

	Pre-annuitization	Post-annuitization Same fixed income portfolio	Post-liability transfer Longer duration portfolio
Assets (\$ millions)	500	250	250
Fixed income duration (years)	17.5	17.5	21.6
Liabilities (\$ millions)	500	250	250
Liability duration (years)	14.7	19.3	19.3
Interest rate hedge ratio	83%	64%	78%
Credit spread hedge ratio	52%	39%	20%
Surplus VaR (\$ millions)	45	28	22

Sources: Vanguard calculations as of June 30, 2022, using MSCI BarraOne risk analytics system.

- 5** Return-seeking assets are investments whose primary objective is to generate a return that exceeds interest on the plan's liability over the long term, thereby helping to cover the cost of benefit accruals, if any, and/or improve the plan's funding ratio, and decrease long-term expected required contributions. The return-seeking assets would include a diversified portfolio of global public equities as well as public and private alternative asset classes.
- 6** Value at Risk can be thought of as the 95th percentile impact on funded position based on a set of capital market assumptions that stress-tests the value of assets and liabilities. In the above example, a \$45 million loss in funded position is the VaR.
- 7** Duration is a measure of interest rate or credit spread sensitivity. An asset portfolio, or a set of pension liabilities, with a duration of 10 years will increase by approximately 10% when interest rates fall by 1%.
- 8** Hedge ratios, both interest rate and credit spread, measure the portion of the liability sensitivity to interest rates (and credit spreads) that is offset by the asset allocation.

What's missing from this analysis?

This comparison is essentially a point-in-time comparison. It compares the price the plan sponsor pays now for the reduction in liabilities and cost, but it doesn't consider additional, and possible increases in, costs to operate the remaining pension plan and any changes in the

characteristics of the remaining plan that may affect its risk. Put quite simply, it is a very narrow analysis that excludes the mechanics of the ongoing management of the pension plan.

Consider the following example in **Figure 3** for a plan with a 3% discount rate⁹ and 5% expected return:

FIGURE 3.
Plan comparison pre- and post-annuitization

		Beginning (\$ millions)	ROA/IC (\$ millions)	SC (\$ millions)	Ending (\$ millions)
Pre-annuitization	Assets	500	25	—	525
	Liabilities	500	15	10	525
	Shortfall	0			0
Post-annuitization	Assets	250	12.5	—	262.5
	Liabilities	250	7.5	10	267.5
	Shortfall	0			5

Notes: This hypothetical illustration does not represent any particular investment and the rate is not guaranteed. ROA is return on assets, IC is interest cost, and SC is service cost.

Source: Vanguard calculations.

⁹ The discount rate is the rate used to discount expected benefit payments when calculating the liability. It is also used to calculate interest cost, or the cost to the pension plan because of the increase in liabilities with the passage of time. A simplified formula for interest cost would be interest cost = liability value x discount rate.

In this example, prior to annuitization, the liabilities would increase each year by \$10 million for service cost¹⁰ (SC) and \$15 million for interest cost (IC), for a total of \$25 million. Similarly, the assets would be expected to increase each year by \$25 million for returns—return on assets (ROA)—during the year. The asset increase would equal and therefore offset the liability increase; this means the plan would stay fully funded with no expected future contributions.

Now consider the post-annuitization scenario. During the year, the liabilities would increase by the same \$10 million for service cost¹¹ and by \$7.5 million for interest cost, for a total of \$17.5 million. The assets would be expected to increase by \$12.5 million during the year. Because of the smaller asset base, the plan no longer earns enough through asset growth to cover both interest cost and service cost, even though the expected return in percentage terms remains the same. In this case, there is expected to be an annual \$5 million shortfall, which must be made up with a contribution from the sponsor.¹²

A standard analysis of risk transfer, as illustrated in the first section, would have concluded that the annuitization was a good deal for the sponsor because it was able to remove \$250 million in liability and all future estimated per-participant costs, which we valued at \$10 million, for \$250 million plus any project-related fees.

The sponsor should have wanted to engage in this transaction, but a more in-depth evaluation would be required to fully understand the ramifications. Case in point: The annual asset growth now produces a shortfall relative to the annual liability growth, which will need to be remedied with expected annual contributions of \$5 million.

This case, in which it appeared that the sponsor was removing liabilities “at par,” is expected to cost the sponsor \$5 million per year because the asset returns are lower relative to the liability’s interest cost and service cost.

These expected annual contributions are an indirect cost of the annuity purchase. Even though they are not being directly paid as part of the transaction, the transaction triggers the projected contribution requirements. In economics, this is called a “spillover effect.”

This spillover effect means that the comparison between the current assets being released (to the insurance company) and the current liabilities and plan costs being settled is insufficient. A complete comparison should include an analysis of the costs and risks of the remaining pension plan.

In this example, the sponsor went from a \$500 million plan with no expected future contributions (asset returns were sufficient to meet service cost plus interest cost) to a \$250 million pension plan that requires \$5 million in annual contributions. A \$5 million annual required contribution was created through the annuitization transaction and should be part of a new decision-making formula that might look like this:

Liabilities released + PV of per-participant costs

compared with

Assets released to settle liabilities +
service fees paid + spillover effect

In our example, what had appeared to be an attractive transaction was revealed to be one that the sponsor may not choose to undertake once the PV of future increased contributions (the spillover effect) is considered.

¹⁰ Service cost is the value of new benefits accruing each year as active participants accrue service during the year and therefore earn benefits.

¹¹ The post-annuitization pension plan has the same active participants as the pre-annuitization pension plan because only retiree liability was annuitized, and therefore service cost does not change.

¹² The authors are aware that minimum funding requirements and regulations are much more complex than what is stated above. However, over the long term, plan sponsors will eventually need to settle any difference between the rate at which liabilities grow and the rate at which assets grow.

What happens next?

The sponsor could eliminate this spillover effect by adjusting the investment portfolio to increase the expected return on assets from 5% to 7%, as shown in **Figure 4**. A 7% expected return would earn \$17.5 million in asset returns, which would be equal to the annual interest cost plus service cost.

However, this will have impacts as well, as any asset allocation change that increases the expected return from 5% to 7% is usually made by increasing the return-seeking allocation and decreasing the fixed income allocation. This could

increase risk in two ways: by increasing market risk and by significantly unwinding the liability hedging program aimed at controlling risk.¹³

When we retrace our steps, we see that the sponsor decreased risk when it made the plan smaller (see Figure 2). But it also made the plan more costly, in the amount of a \$5 million annual contribution (see Figure 3). The next step will be to make the plan “cost-neutral” or to increase the expected return to offset the annual increase in the liability (see Figure 4) and return to a “no expected contribution” situation.

FIGURE 4.
The effects of changing asset allocation to increase expected return on assets

		Beginning (\$ millions)	ROA/IC (\$ millions)	SC (\$ millions)	Ending (\$ millions)
Pre-annuitization	Assets	500	25	—	525
	Liabilities	500	15	10	525
	Shortfall	0			0
Post-annuitization— 5% return	Assets	250	12.5	—	262.5
	Liabilities	250	7.5	10	267.5
	Shortfall	0			5
Post-annuitization— 7% return	Assets	250	17.5	—	267.5
	Liabilities	250	7.5	10	267.5
	Shortfall	0			0

Notes: This hypothetical illustration does not represent any particular investment and the rate is not guaranteed. ROA is return on assets, IC is interest cost, and SC is service cost.

Source: Vanguard calculations.

¹³ Capital market assumptions may vary, but we are assuming that an increase of this magnitude would require a 40% reallocation from the fixed income portfolio to the return-seeking allocation. That means we have changed our asset allocation from 30% return-seeking/70% fixed income to 70% return-seeking/30% fixed income.

The next steps are shown in **Figure 5**. The decision to make the asset allocation cost-neutral relative to the pre-annuitization situation is shown in column 2, where the return-seeking allocation is increased to 70% and the fixed income allocation is decreased to 30%. This lowers the interest rate and credit spread hedge ratios and increases the surplus VaR to \$57 million, higher than it was prior to the risk transfer (which was \$45 million; see Figure 2).

The sponsor now has a pension plan that is smaller than the initial plan, by \$250 million; has an asset return designed to keep pace with liability growth (i.e., no expected impact from future contributions); but is now more volatile on a dollar basis in terms of surplus VaR. To maintain the expected future costs of the plan, we have significantly increased risk on a dollar basis. (Not exactly a risk transfer!)

The sponsor still has options, though: It can add interest rate derivative exposure, such as U.S. Treasury futures, to further manage its interest rate risk (Dion and Dutton, 2020). By our calculations (see column 3), adding a 45% allocation, or \$114 million notional exposure, to long-term Treasuries through the use of Treasury futures will increase the hedge ratio to the point where the surplus VaR is equal to where we started prior to the annuitization, or \$45 million.

It seems as if we have gone in a circle: We had a no-expected-contribution pension plan with a surplus VaR of \$45 million prior to annuitization and we now have the same after the annuitization (no expected contributions and a surplus VaR of \$45 million), but only after a retiree annuitization project, significant asset allocation changes, and the introduction of Treasury futures.

FIGURE 5.
The trade-offs in creating a cost-neutral asset allocation

	Post-liability transfer Longer duration	Post-liability transfer 70% return-seeking allocation	Post-liability transfer 70% return-seeking allocation with Treasury futures
Assets (\$ millions)	250	250	250
Fixed income allocation	70%	30%	30% physical exposure and 45% notional exposure
Fixed income duration (years)	21.6	21.6	19.6
Liabilities (\$ millions)	250	250	250
Liability duration (years)	19.3	19.3	19.3
Interest rate hedge ratio	78%	34%	76%
Credit spread hedge ratio	20%	8%	8%
Surplus VaR (\$ millions)	22	57	45

Sources: Vanguard calculations as of June 30, 2022, using MSCI BarraOne risk analytics system.

What variables can change the outcome relative to our example?

Service cost

Higher service cost will increase the growth rate of plan liabilities and make it more difficult for the pension plan to remain cost-neutral after the annuitization, unless there is an even larger reallocation to return-seeking assets or more significant use of Treasury futures. A plan with high service cost relative to liabilities would be less likely to undertake a large pension risk transfer because the reduction in the asset base makes it less likely that the assets can match the liability growth rate and/or is more likely to result in a higher expected future contribution or a higher surplus VaR, or both.

Lower service cost—or even no service cost, as is the case with a frozen pension plan—will decrease the growth rate of plan liabilities and make it easier for the pension plan to remain cost-neutral after a risk transfer (Gannon and Klein, 2021). The plan may need only a small reallocation to return-seeking assets—or even none, for a frozen pension plan. A plan with low service cost relative to liabilities would be more likely to undertake a large pension risk transfer because the reduction

in the asset base does not have nearly the impact on the ability of assets to earn the liability growth rate.

Funded status

A plan with higher funded status would be more likely to undertake a risk transfer because it can use the status to pay for, or fund, the outcomes of a risk transfer.

A plan with lower funded status would be less likely to perform a risk transfer because it may need not only to earn returns to cover service cost and interest cost, but also may need additional returns to reduce the plan's deficit. An underfunded plan would likely have to make contributions to the plan—another spillover effect, and something that should be considered when making the risk transfer decision.

Duration

A plan with shorter liability duration for the remaining plan participants would be more inclined to engage in the annuitization because it is easier to implement the interest rate hedging strategy without increasing the fixed income allocation or introducing a significant exposure to derivatives.

Conclusion

The decision of whether to undertake a pension risk transfer is often presented and evaluated within a very narrow scope:

Liabilities released + PV per-participant costs

compared with

Assets paid to facilitate the risk transfer +
service fees paid

This analysis overlooks the key risk factors in managing the remaining pension plan, which is often significantly different from the original pension plan. The remaining plan will often have a higher liability duration, which exhibits more volatility on a per-dollar basis, as well as a smaller asset base, which will make it more difficult to earn sufficient returns to cover the annual liability growth.

Plan sponsors evaluating a risk transfer will need to consider a more complete picture that includes the impact of the spillover effect or any additional costs to run the remaining plan using a comparison that looks more like:

Liabilities released + PV of per-participant costs

compared with

Assets paid to settle liabilities +
service fees paid + spillover effect

Yes, the plan may be smaller, which benefits the sponsor because a smaller plan can have a smaller impact on the corporate balance sheet.

However, the plan may have a liability with a higher growth rate and longer duration, as well as a smaller asset base. These factors often point to a higher return-seeking allocation—a key source of asset/liability tracking error and risk—which is needed for the post-risk-transfer plan to remain cost-neutral relative to the pre-risk-transfer plan, especially if the plan is underfunded or has service cost. The longer liability duration means the plan will need to make increased use of longer-duration fixed income or even Treasury futures to control risk, especially when combined with a higher return-seeking allocation and a lower allocation to the underlying fixed income asset.

None of these should be considered reasons not to undertake a pension risk transfer, but all should be considered when deciding whether to do so.

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