Russell Investments

Viewpoint

Russell Research

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Liability-responsive asset allocation

In this paper we will argue that some pension plans should consider adopting a dynamic approach to strategic asset allocation, one that is tied to changes in the funded status of the plan. We have called this approach liability-responsive asset allocation.

Introduction: The conceptual grounding of liability-responsive asset allocation

The asset allocation policy decision has long been regarded as the keystone of a defined benefit (DB) pension plan's investment strategy. For many years, this decision was typically reviewed on a three- or five-year cycle. The policy decision made at each review was held constant until the next review, with rebalancing policies in place to ensure that the actual allocation did not deviate too far from policy. More recently, actuarial valuations have moved to an annual cycle, and the results of those valuations have become more variable, thanks to market volatility and the shift toward mark-to-market brought in by the Pension Protection Act of 2006 (PPA). Because of this, asset allocation reviews are also carried out more often.

In the U.S., the asset allocation decision has increasingly focused on surplus management rather than on assets in isolation. While asset-liability modeling has been around for many years, recent developments have taken this focus on liabilities to a new level. The growth of liability-driven investing (LDI) marks a substantial change in the extent to which asset allocation decisions are designed to match liability behavior, rather than simply to maximize returns and manage asset volatility.

All of this has created a situation where the asset allocation decision depends more than ever on a plan's funded status. Now we must begin to ask whether the current practice – setting an asset allocation policy on the basis of the current funded status and leaving that policy in place until the next review, even if the funded status changes significantly – is still enough. Is it possible instead to create a process whereby the policy would vary with the funded position?

To put this question into concrete terms: if a pension plan decides to allocate 60% of its portfolio to return-seeking assets (such as equities)[1] when its funded status is 70%, but knows that it would have only a 20% allocation if its funded status were 110%, then why would that plan not track its funded status and dynamically adjust the allocation accordingly?

This approach is clearly a form of dynamic asset allocation. However, there are other forms: for example, many plans make tactical shifts in light of views about the likely short-term returns (or, occasionally, risks) expected from particular asset classes or market segments. To distinguish the form of dynamic asset allocation we are exploring in this paper from those other forms of dynamic asset allocation,[2] we will use the term *liability-responsive asset allocation*. To be clear: the dynamic nature of this approach derives not from any change in opinion about the nature of the asset class opportunities that lie before the investor. Rather, it derives from a change in the funded status of the pension plan, which affects the risk-reward trade-off that the asset allocation choice represents.

To distinguish the form of dynamic asset allocation we are exploring in this paper from those other forms of dynamic asset allocation, we will use the term liability-responsive asset allocation.

In this paper we will explore the concept of liability-responsive asset allocation in more detail and provide examples of what it might mean in practice.

The asset allocation decision has become more dependent on funded status

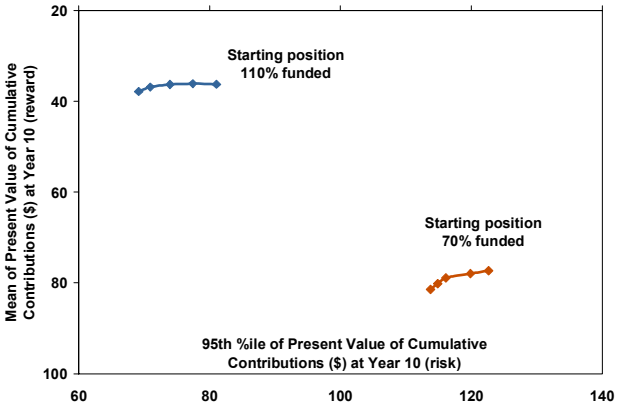
From the argument above we can see that liability-responsive asset allocation should in theory represent an improvement over the traditional static approach. However, the extent to which this improvement is material will depend on the extent to which the asset allocation decision depends on funded status. After all, if the policy adopted at one particular funded status is only marginally different from one that would be adopted at another, then liability-responsive asset allocation brings to the table more trouble than it is worth. The approach clearly demands greater effort to implement (a point to which we will return), and the prospective gains need to be material if undertaking that effort is to prove worthwhile. For now, though, let's set the implementation issues to one side and concentrate on the theoretical variation of the asset allocation decision in response to changes in funded status.

Exhibit 1 shows the risk-reward trade-off a pension plan typically faces when making an asset allocation decision. The analysis, described in the appendix, is a form of the classic risk-reward frontier familiar to most readers, but expressed in terms of the contributions that will likely be required from the plan sponsor over the following ten years.

[1] The industry has long used the division between equity-type investments and fixed income-type investments as a single point of shorthand to describe an asset allocation policy (as in "60/40" investor). In reality, institutional investors use a much wider range of return-seeking (or "risky") assets than just equities, and fixed income portfolios are not exclusively used as liability-matching assets, but may also have a return-seeking objective and accordingly contain an element of liability mismatch. These are very important points in the creation of an actual asset allocation policy, but they do not impact our argument, which concentrates purely on the high-level risk decision. We have therefore chosen to keep our narrative as simple as possible by basing our analysis on just two very broad asset categories, and (following the established shorthand) we have used the broad terms "equities" and "fixed income" to capture this distinction throughout this paper, except where we judged a more precise description necessary. The fixed income portfolio is assumed to consist of long-duration government and corporate bonds, in order to broadly match the characteristics of the liabilities.

[2] A hierarchy of asset allocation decisions is set out, for example, in William F. Sharpe, "Integrated Asset Allocation," Financial Analysts Journal, Sept./Oct. 1987; Vol. 43, No 5:25-32.

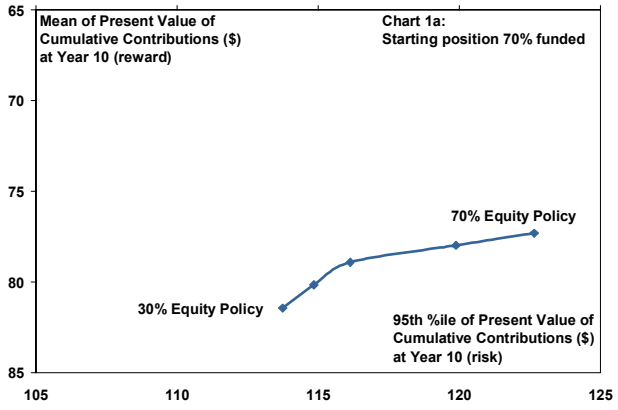
Exhibit 1 / Example plan: Risk-reward trade-off is different at 70% funded than at 110%

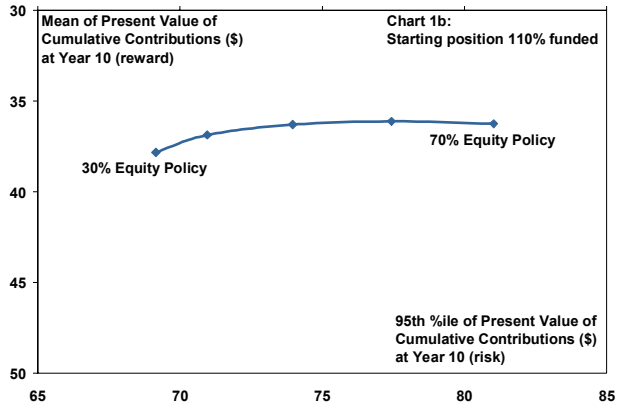


Forecasting represents predictions of market prices and/or volume patterns utilizing varying analytical data. It is not representative of a projection of the stock market, or of any specific investment.

The curve at the upper left of the exhibit shows the risk-reward trade-off if the plan is 110% funded; the curve at the lower right shows the trade-off at 70% funded. The relative positioning of the two sets of results shows what would be expected: that the average contributions are lower in the 110% case and, likewise, that the expected risk is lower (i.e., the 95th percentile outcome is better, too). It is not the relative placement of the two lines that is our main focus here, however, but rather their shape. The shape of the curve shows the trade-off between an equity-oriented strategy and a fixed income–focused strategy. In order to show the shape of the curves more clearly, we show in Exhibits 1a and 1b the same results, with the scale magnified.

Exhibits 1a and 1b / Example plan: The risk-reward trade-off is different at 70% funded than at 110%





Forecasting represents predictions of market prices and/or volume patterns utilizing varying analytical data. It is not representative of a projection of the stock market, or of any specific investment.

As we consider these results, we should bear in mind that the actual asset allocation decision that is made does not depend solely on the trade-off. When faced with the same risk-reward trade-off, different plans make different decisions, depending on the risk tolerance of the trustees, the ability of the sponsoring company to meet the expected contribution requirements, the sponsor's tolerance for unexpected downside if market conditions are poor, and other factors.

For example, in the case shown above at 70% funded, a higher equity allocation offers an expected reward (i.e., lower contributions over time) accompanied by higher risk (as measured, in this case, by the contributions required at the 95th percentile outcome). This is the classic risk-reward trade-off we are accustomed to. Different plans will select different portfolios. Let's suppose that one particular plan, at 70% funded, chooses the 60/40 portfolio.

Would this plan choose the same portfolio if it were 110% funded? Probably not. At 110% funded, the 60/40 portfolio shows higher risk than the 40/60 or the 50/50, but it does not show noticeably lower expected contributions.

This result – no reduction in expected contributions under the high-equity strategy – is not what might be expected. After all, on average, equities are expected to outperform fixed income, so it would be reasonable to expect that this would translate into lower expected contributions. And, indeed, this is exactly the pattern we saw at 70% funded.

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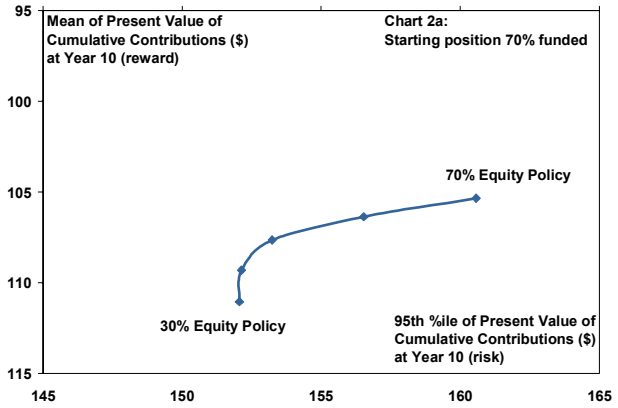
That the pattern is different at 110% funded is due to the way contributions are calculated under PPA. In particular, PPA requires that funding shortfalls be made up over a fairly short time period (in general, roughly seven years). This, combined with the volatility of equity markets, creates a ratchet effect whereby contributions need to go in during weak markets but do not come out again in strong markets. This limits the upside from the good years. The net effect is that even though equity markets are assumed to outperform on average, a well-funded plan can find that expected contributions are not lower, and may even be higher, under such a strategy. This dynamic is not evident at 70% funded because the upside of equity returns is useful in this case for offsetting the catch-up contributions needed to make up the initial shortfall.

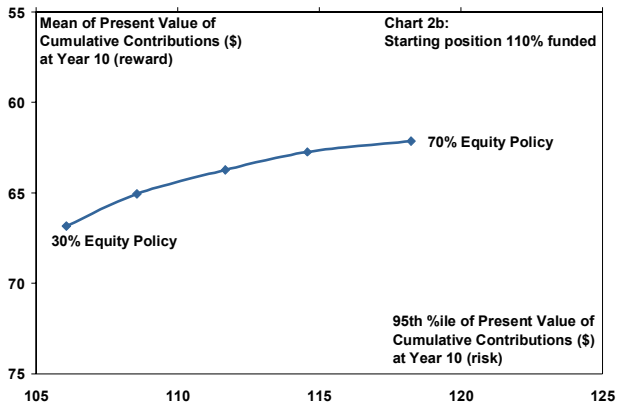
The changing shape of the trade-off depends on the rate of accrual of new benefits

The extent to which new benefits are accruing also has an impact on the ratchet effect we have described above. This is because new benefit accruals provide another use for the upside of equity returns, even if a plan is fully funded. Indeed, one of the reasons that liability-responsive asset allocation is more valuable today than in the past is that the rate of new accruals relative to existing assets is so much lower than it was because plans have matured and have, in many cases, frozen or reduced benefit accruals. This can be seen in the exhibits below.

The analysis has so far assumed that new benefits accrue each year at a rate of 2½% of existing liabilities. This experience is typical of many plans. However, some plans accrue at a higher rate than this and, at the other extreme, a frozen plan may have no benefit accruals at all. Therefore, we repeat below the analysis of Exhibits 1a and 1b, first with the rate of new benefit accruals set to 5% of existing liabilities each year, and then with no new benefit accruals.

Exhibits 2a and 2b / High-accrual plan: The changing trade-off is less noticeable





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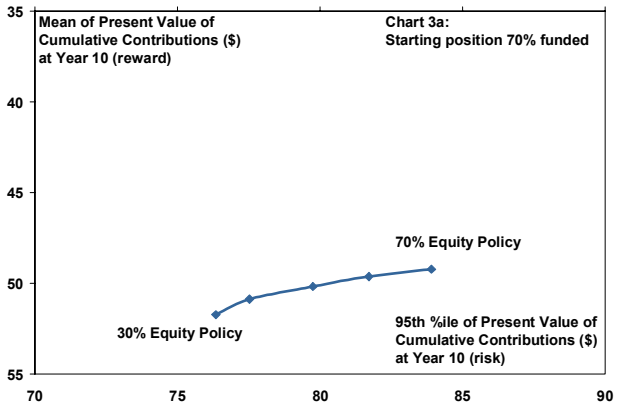
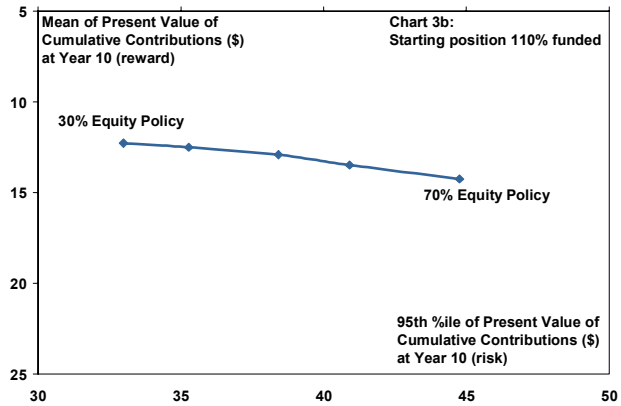
Exhibits 3a and 3b / No-accrual plan: The change in trade-off is dramatic





Forecasting represents predictions of market prices and/or volume patterns utilizing varying analytical data. It is not representative of a projection of the stock market, or of any specific investment.

We see that the difference in the trade-off between the two funding situations is less marked when benefit accruals are higher. Even at 110% funded, there is still a reward (in terms of expected lower contributions) to the higher equity strategies: the asset allocation decision must still trade this benefit off with the greater uncertainty of equities. However, in the no-accrual case, the difference between the 70% funded and the 110% funded picture becomes even more acute: the exhibit with a 110% starting point clearly shows a downward slope.

It is worth taking a moment to consider what this no-accrual result in Exhibit 3b is telling us. In essence, it is simply putting numbers to the observation that if a plan is fully funded and has no new benefit accruals, and if asset behavior can be matched closely enough to liability behavior, then no further contributions to this plan should ever be required.[3] In that situation, choosing to adopt a different investment strategy in pursuit

[3] The qualification that "if asset behavior can be matched closely enough to liability behavior" is, of course, quite a big "if." While significant steps can be taken to match asset and liability behavior much more closely than is currently typical, completely closing down all sources of risk is challenging.

of higher returns can achieve nothing in terms of lowering those contributions; you can't pay less than zero. On the other hand, if the return-seeking strategy is unsuccessful it could lead to a shortfall. In this sense, such a strategy therefore represents all risk and no reward. At 70% funded, however, this plan does have a reward from the return-seeking strategy: the possibility of investment returns closing the funding shortfall, so that fewer catch-up contributions are needed from the plan sponsor.

Behind this argument lies the concept of trapped capital. The reasoning used above is derived from the starting point that a dollar of investment return is not equally valuable in all circumstances. In particular, if it arises in a fully funded frozen plan, extra return may be trapped and offer little economic benefit to participant or sponsor.[4] It is this that in turn leads to the dynamic risk-return trade-off we have illustrated above, and from there to the case for liability-responsive asset allocation.

Liability-responsive asset allocation

So we see that some pension plans – most notably frozen plans, and others with low rates of new benefit accruals – will find their risk-reward trade-off varying with their funded status. While this has long been true to some extent, it has become much more noticeable recently given the increasing maturity of plans, the increasing number of frozen plans and the more noticeable ratchet effect that has been created by PPA's mark-to-market requirements and increased funding targets.

This in turn leads to the need to consider whether the traditional fixed approach to asset allocation is still the most effective. We would argue that some plans should be considering a more dynamic approach: asset allocation that is responsive to liabilities and, in particular, to funded status. Under this approach a plan selects an asset allocation policy to reflect its current circumstances, but also specifies different policies that apply at different funded levels. As the plan's actual position varies, the asset allocation is automatically adjusted in accordance with this schedule.

Under this approach a plan selects an asset allocation policy to reflect its current circumstances, but also specifies different policies that apply at different funded levels.

As we stated earlier, this approach is dynamic, but not in response to changing opinions about the outlook for capital markets or the risk of any given asset, and not in its treatment of the time horizon over which the trade-off is being judged. Rather, it is dynamic in response to plan circumstances. In this sense, it is a subcategory of the broad range of possible dynamic asset allocation policies, and hence we have chosen the more specific phrase liability-responsive asset allocation to refer to this approach.

[4] We have ignored here the possibility of a return of surplus from the plan to the plan sponsor. In the U.S., such a refund would currently result in a substantial tax liability (not only corporate tax – to offset the fact that the contribution was tax-deductible when originally made – but an excise tax of 50% on top of that). To the extent that surplus is returnable to the plan sponsor, or useful in some other way, the dynamic pattern we have illustrated would become weaker.

An example of a liability-responsive asset allocation schedule

There are a number of ways to generate an asset allocation schedule that varies with funded status. The schedule will depend on whether the dynamic policy is to be a one-way or a two-way street. In other words, if risk is taken off the table when funded status improves, will it be reinstated should funded status subsequently fall back down? The argument that we have set out in this paper would lead, as it stands, to a two-way street. However, some investors will adopt liability-responsive allocations with the explicit goal of moving toward LDI, while feeling unwilling to jump too far at depressed market levels. For these investors, a schedule that leaves in the portfolio risk that is already there but does not reintroduce it after it has been removed, might be attractive in that it creates a disciplined and well-defined path toward a closer hedge between assets and liabilities over time.[5]

Example schedule (two-way street):

Funded Status	Equity or Return-Seeking Allocation	Liability-Matching Fixed Income Allocation
110% (high-water)	20%	80%
105%	25%	75%
100%	30%	70%
95%	35%	65%
90%	40%	60%
85%	45%	55%
80%	50%	50%
75%	55%	45%
70% (current)	60%	40%
65%	65%	35%
60% (low-water)	70%	30%

We describe below one way in which a liability-responsive asset allocation schedule might be built as a simple extension of the normal strategic review process:

- First, establish the chosen asset allocation policy for the current funded status in the usual way.
- Next, establish a high-water mark up to which the dynamic policy is to operate. This high-water mark might be 110% or 115% funded for a frozen plan; i.e., fully funded plus a margin to allow for the possibility of adverse experience even with a fully matched investment program. For a plan with benefit accruals, the high-water mark might be higher.
- Define the asset allocation policy that will apply should that funded status be reached. This might be a fully matched strategy or it might specify some low level of equity allocation (up to 20%, perhaps) on the grounds that perfect hedging is impossible and that there is some diversification gain – and only marginal incremental risk at the total portfolio level – to be had from a small degree of equity exposure.
- Fill in the intermediate asset allocation policies to produce a reasonable scale between the current and the high-water policies (a simple linear scaling may be adequate for this purpose).[6]
- For funded status below the current level, continue the schedule down to a low-water mark at which the maximum equity exposure with which you would be comfortable is reached. In the case of a one-way street, the low-water mark is the current funded status.

By setting the rules in advance, actions can be taken quickly and effectively without further decisions being required from the governing board.

[5] Clearly, while the theoretical argument for liability-responsive asset allocation has been framed in this paper largely as a stand-alone concept, the practical context in which pension plans will consider it is one in which liability-driven investing and de-risking are top of mind. More on that subject can be found in Bob Collie, "Where next for LDI?", Russell Retirement Report 2009.

[6] We have not explored alternative scaling choices in this paper, but some investors may prefer a schedule that is closer to a cliff in design, with little or no drop-off in return-seeking assets until close-to-full funding is achieved, and a substantial change at that point.

Practical considerations

We list below some of the practical considerations that arise under a liability-responsive approach to asset allocation.

Data availability: As has been noted above, the case for liability-responsive asset allocation has grown considerably stronger in recent years. There is, however, another reason why this approach has received little attention until now: it would have been almost impossible to implement. In particular, funded status cannot be calculated without a liability value, and liability values are generally calculated by plan actuaries only once a year. In addition, there is a considerable lag between the valuation date and the time the results become available. For a January 1 valuation date, for example, liability values might not be available until July or August.

It is, however, possible to gain reliable estimates of liability values more frequently – quarterly or monthly, for example – by using the most recently available valuation data, adjusted for changes in the valuation yield curve. This is because while actual results depend on all aspects of the plan's experience, it is changes in interest rates that are by far the biggest cause of change in liability values over short time periods. Adjustment for benefit payments and new benefit accruals improves the accuracy of the estimates. When new valuation results become available from the plan actuary, these estimates can be trued up and the estimation cycle starts again. Russell has been providing estimated liability values to clients using this approach for more than a year.[7]

There is, however, another reason why this approach has received little attention until now: it would have been almost impossible to implement.

The process for following a liability-responsive asset allocation might therefore start with a quarterly estimate of liability values, using quarter-end yield curves (and allowing for benefit payments and accruals during the past quarter). Asset values are easier to obtain.

Effective date of changes: For ease of management, it is usually best to make any changes in asset allocation policy effective at a month end. This minimizes the practical disruption to, for example, performance measurement calculations and the broader cycle of reporting and oversight. Because the changes are being made for strategic reasons, not market-timing considerations, it can make sense to make them effective with a one-month lag, giving time to gather the required information, make the necessary calculations and plan the execution of the change.

Contributions: The implementation of a liability-responsive approach should also be integrated with the payment of contributions by the plan sponsor. The payment of contributions changes the funded status of the plan, and also provides an opportunity to effect asset allocation changes at lower cost than if the move to the new policy is made through the sale of one asset and the purchase of another.

For example, a plan may have $100 of liabilities and $70 of assets, of which $42 (60%) is in equity and $28 (40%) is in fixed income, in accordance with the asset allocation schedule shown in the example above. If a contribution of $10 is made by the plan sponsor, then the funded status improves to 80%. As a result, the target allocation changes to 50% fixed income, which would imply a total of $40 allocated to that asset class. Therefore, the contribution should be allocated in full to fixed income investments. If the resulting allocation ($42 equity and $38 fixed income, or 52½% / 47½%) is outside the rebalancing ranges of the new strategy, then a further rebalancing trade may be needed (selling equity and buying fixed income to get to the

[7] For DB plans in general, and particularly for the type of plan that would adopt a liability-responsive allocation schedule, the progress of the plan's funded status is increasingly the dominant management metric, rather than the progress of the asset portfolio alone. Reporting practices need to adapt to meet this new focus.

new policy). However, the amount of trading required has been kept to a minimum by integrating the receipt of the contribution with the revision of the asset allocation policy.

Rebalancing policy: A liability-responsive approach means that rebalancing policies would need to be adjusted to recognize the dynamic baseline around which rebalancing is now being carried out. The sophistication of rebalancing policies and practices varies greatly from plan to plan, and it is beyond the scope of this discussion to explore in detail the implications of a liability-responsive approach on this discipline. Those considering adopting this approach should, however, note that it will have implications for those rebalancing policies and practices. In particular, if a plan has a material allocation to illiquid assets (such as private equity or private real estate), then explicit allowance for this should be made in defining the approach to be taken.

Trading: A plan's rebalancing procedures should specify both the means for adhering to asset allocation policy (whether that policy is fixed or dynamic) and the trading procedures that are followed to that end. However, a dynamic policy can potentially lead to larger trades, especially if it involves substantial steps (such as the 5% increments in the example policy shown above) rather than smaller, more frequent adjustments.

One advantage of the larger-increments approach is that changes are required less often. It also means that when a change is required, its size makes worthwhile the effort of focusing on managing the trading costs and creating a specific transition plan. This may lead to a lower cost than the cumulative cost of more frequent, smaller moves. On the other hand, those smaller moves would place fewer demands on the governing board and plan staff and would be less likely to strain the effectiveness of normal rebalancing procedures.

Governance process: A liability-responsive approach is more complex than a fixed asset allocation, requiring increased monitoring by more parties and introducing additional procedures into the plan's operation. The approach described above has been designed to produce a policy that is systematic and clear. It sets a course that is dynamic rather than fixed, but that is nonetheless fully defined at the point at which the decision is made. Once a policy is set, it is important that its execution should be as effective and automatic as possible. Procedures for the execution of the policy, including the actions required by plan staff and/or external providers, should be defined without requirements for additional layers of approval from the governing board or others.[8]

Reporting: Procedures for reporting on the progress of the dynamic policy should also be defined. This would include the asset and estimated liability values and the funded status at each measurement point, as well as the resulting asset allocation policy and (if a change was made) the steps taken to move to that policy position.

Formal review of policy: Other aspects of the asset allocation decision (such as the capital market assumptions) change over time, sometimes substantially. For this reason, it remains important to revisit the policy decision regularly. Indeed, any plan for which a liability-responsive policy is worthwhile should probably be conducting a more formal review of policy annually, as updated actuarial data becomes available.

[8] Clearly, the governing board is able to revise the policy at any time, should it wish to do so (just as it is free to reconsider a fixed policy). Our point here is that the path to be followed – in the absence of specific further instructions from the board – should be to implement the dynamic policy that has been chosen without requiring further approval for the specific actions it creates.

Conclusion: A better mousetrap for many defined benefits plans today

Liability-responsive asset allocation is a concept that allows pension plans to fine-tune their investment policies to better reflect their changing circumstances. For an increasing number of defined benefit pension plans in the U.S., the expected benefit of an equity-oriented investment strategy reduces as funded status improves, because of the risk of trapped capital in the event of favorable investment experience. This alters the risk-reward trade-off that underlies the asset allocation decision. Other things being equal, the stronger a plan's funded status becomes, the more cautious the desired policy should be. Liability-responsive asset allocation allows a plan to adopt an appropriate level of equity investment at a particular funded status, while also allowing for automatic adjustment of that strategy if funded status changes materially.

Liability-responsive asset allocation requires greater effort to implement than does the traditional approach. Its potential benefits are greatest for plans with low rates of new benefit accruals, such as frozen plans. In this paper, we have described how a plan might implement such a strategy by setting out a framework that is both practical and disciplined, and we have explored some of the challenges the plan could face.

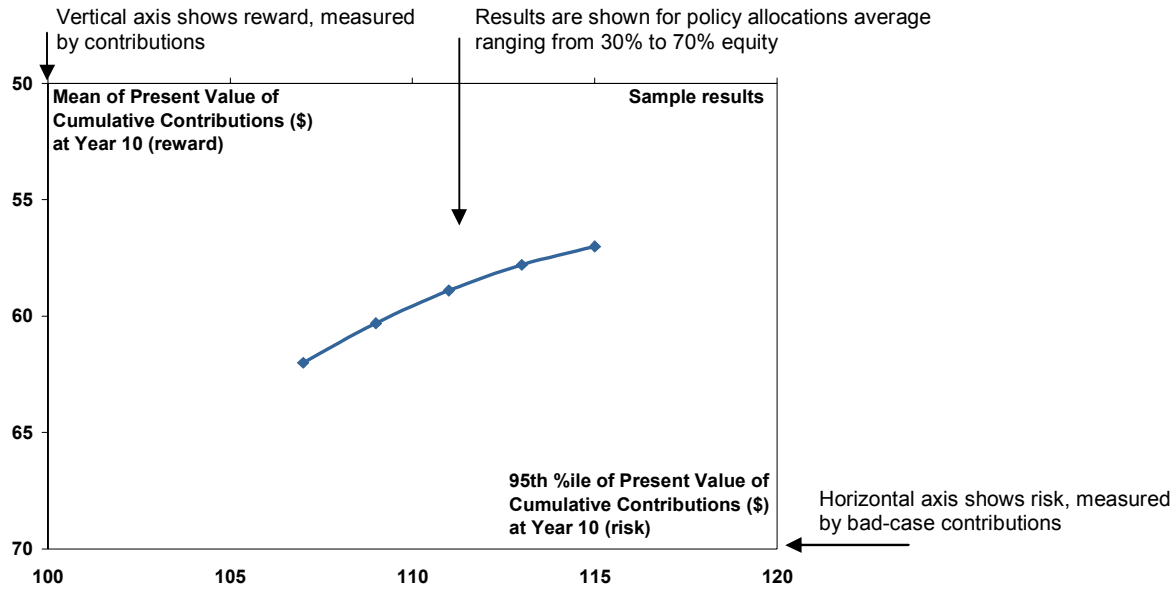
Liability-responsive asset allocation allows a plan to adopt an appropriate level of equity investment at a particular funded status, while also allowing for automatic adjustment of that strategy if funded status changes materially.

Appendix

A GUIDE TO INTERPRETING THE RISK-REWARD EXHIBITS USED IN THIS PAPER

All analysis in this paper has been based on a hypothetical composite pension plan constructed by aggregating the expected future benefit cash flows of 61 actual pension plans representing, in total, more than $36bn of liability. In other words, it represents a truly typical liability profile.

The variable represented by the left-hand (vertical) axis shows the expected reward associated with a particular asset allocation policy: the measure used is the expected (mean) value of the contributions the plan sponsor will need to make over the next ten years. In order to create the familiar risk-reward format, the scale is inverted, so that lower expected contributions appear higher on the exhibit.



The lower (horizontal) axis shows the expected risk, which is here characterized by the 95th percentile of those contributions. In other words, across a large number of projections for the medium-term experience of the plan, 5% of outcomes result in cumulative contributions in excess of this amount.

Contributions (calculated in this example in accordance with the minimum requirements of the PPA) provide an objective measure of the progress of the plan, which is relatively unaffected by differences in assumptions among actuaries. We should note that this analysis is based on just one measure of expected reward and one measure of expected risk over one time horizon. It does not take into account, for example, the surplus or deficit in the plan at the end of the projection period. An actual asset allocation decision will generally look at a wider range of metrics and time periods. However, this characterization of the risk-reward trade-off – using a single measure – is adequate for exploring the subject at hand.

When interpreting the results, note that an upward-sloping line implies that a risk-reward trade-off is indeed present, and that a downward-sloping line implies that some policies result in both higher expected risk and higher expected reward than others (at least as measured by reward and risk as described above).

A few other assumptions were also needed: new benefits were assumed to accrue at the rate of 2½% of existing liabilities each year. The capital market assumptions are the standard strategic assumptions used by Russell for US$ investors (as of December 31, 2008).

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