Dear Actuary:

How does the life cycle of a pension plan impact the appropriate investment allocation for assets?
- Pondering in Pasadena

Dear Pondering,

That's a great question. Not all pension plans are alike, and the differences are important to consider when a plan sponsor is setting an investment allocation policy. Let's start by talking about the three stages in the life cycle of a typical pension plan and the characteristics associated with each stage. This will highlight the financial needs of the pension plan as it ages and provide insight into the types of investment instruments that suit those needs.

***Infancy*:** When a sponsoring employer sets up a pension plan, it has no assets and no liabilities. From that point on, employees begin accruing benefits (liabilities) until they terminate employment or retire, and the employer starts contributing money (assets) into a pension trust to fund those benefits.

At this stage, the demographic makeup of the pension plan is younger and consists only of actively employed members. The cash flows for the plan are comprised of two components: employer and employee contributions coming into the plan to fund future benefits, and payments out of the plan to pay administrative expenses. At this stage of the life cycle, pension plans have few near-term obligations. Because of this, the plan's assets can be invested somewhat aggressively to maximize long-term returns. The plan has time to ride out any short-term market volatility before it is required to liquidate holdings to pay benefits. The lack of near-term obligations provides flexibility, because the plan is unlikely to need to divest from individual funds earlier than intended or make unwanted changes to asset allocations.

The goal for the plan at this point is to rapidly accumulate assets through contributions and investment returns. From an investment perspective, the way to achieve that goal is to allocate a larger portion of the asset portfolio to higher-yield/higher-risk investments such as domestic and foreign equities. Pension plans in the infancy stage may also decide to invest a portion of the portfolio in illiquid assets like hedge funds, real estate, or private equity.

***Middle-aged plan*:** After a plan has been in place for a few decades it enters the middle-aged stage of the life cycle. During this stage, the demographic makeup starts to shift. The number of retirees starts to grow as the first group of employees reaches retirement age. This stage of the life cycle could be compared to working parents in their 40s: They have steady earnings and their retirement savings have increased over the years, but at the same time their expenses (mortgage, children's college tuition, etc.) have increased along the way.

The increasing number of retirees means that the plan is using more assets to pay benefits, but the contributions coming into the plan may not be increasing as much. This means that a middle-aged plan's net cash flow (contributions into the plan minus expenses and benefit payments out of the plan) starts to decrease compared to the infancy stage.

Because of the decline in net cash flows, the investment allocation typically changes for a middle-aged plan and becomes more conservative. The level of conservatism will vary based on the risk appetite of the plan sponsor. With a growing amount of pension benefits to pay, there is less flexibility for a plan to wait out recessions and economic downturns prior to divesting from specific investment funds. If the value of investments suddenly decreases and the plan is required to liquidate assets to pay benefits, that loss of value is locked in and can't be recovered. The investment strategy for plans in the middle-aged stage of the life cycle therefore is often to gradually increase the investments in fixed income such as corporate bonds and government-backed securities.

Pension plans generally stay in the middle-aged stage of the life cycle for an extended period of time. As long as the plan remains open to new members, keeps the ratio of actives to retired members in balance, and assets keep pace with ongoing liabilities, the plan can stay in this stage indefinitely.

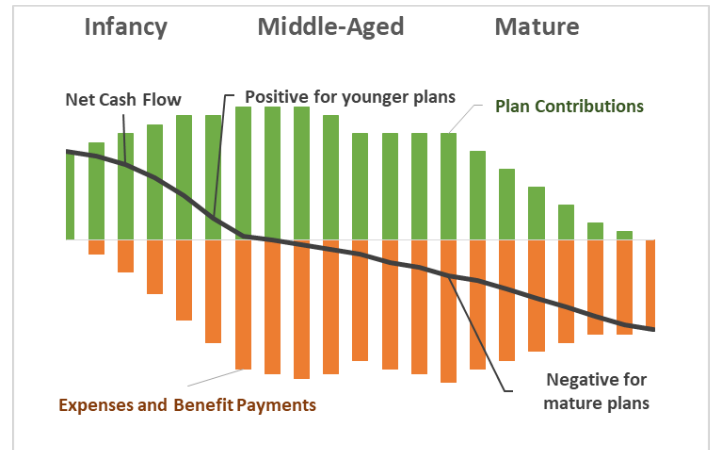
***Mature pension plan*:** A pension plan moves to the final stage of the life cycle when the liability for retired and inactive members begins to exceed that of active employees by a wide margin. This stage of the life cycle can occur "naturally" for an ongoing pension plan. Many public pension plans have matured as a result of increases in retiree longevity over the years. A change to the mature stage can also be triggered intentionally. An employer that sponsors a pension plan may shrink its workforce

due to budgetary constraints, be absorbed by another entity, or decide that it wants to offer a defined contribution plan to new employees instead of a pension benefit. Changes like these can permanently shift the demographic makeup and operating strategy of a pension plan.

When the number of active members starts to decline, the outgoing benefits being paid to retired members often is far greater than the incoming contributions. The plan must rely on current asset reserves and investment earnings to fund immediate pensions. At this mature stage, large investment losses can create significant underfunding problems for a plan. There is little time to recover lost earnings as money is leaving the plan. It may also be difficult to make up for funding shortfalls using additional contributions because the contribution base (active employee payroll) may be shrinking or gone.

To decrease market exposure and mitigate against the risk of large investment losses, mature pension plans typically invest more conservatively. An appropriate investment strategy at this stage might include some equities and higher-risk instruments, but the bulk of the portfolio is typically allocated to fixed income securities.

The following graph illustrates the relationship between contributions, distributions, and net cash flow. It also shows how the cash flow changes over the course of a plan's life cycle. As the net cash flow decreases, plan sponsors generally move assets to less volatile asset categories.



You should keep in mind that the allocation of assets is unique to each pension plan. There are general bounds for the portion of a plan portfolio that should be allocated to certain investment categories, but these ranges can be fairly large and a specific investment strategy for one plan may not suit the timetable or goals of another.

If you're still confused or want to learn more, call me! Also, stay tuned for my next column.

Your Milliman Actuary

P.S. Thanks to Eamon Dick, ASA for technical assistance and an informative illustration.

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For more information about defined benefit pension plans, see prior letters here.

Do you have a question about your defined benefit pension plan? Write to us at dear.actuary@milliman.com.

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