Part 1 - Managing Risks in Defined Benefit Pension Plans

Defined benefit (DB) pension plans have many risks and, unfortunately, these risks are not always addressed and managed appropriately. In some cases, plan sponsors move to defined contribution (DC) plans as they feel these are risk-free but there is no such thing as a risk-free plan. It comes down to who is responsible for managing the risk and what other risks are created by the different plan types.

We will be discussing a variety of defined benefit pension plans, defined contribution plans, the various risks associated with each plan design, and the advantages and disadvantages of each.

To make these discussion papers easier to read, we will be focusing on one plan design in a series of papers. The various discussion papers will cover the following plan designs:

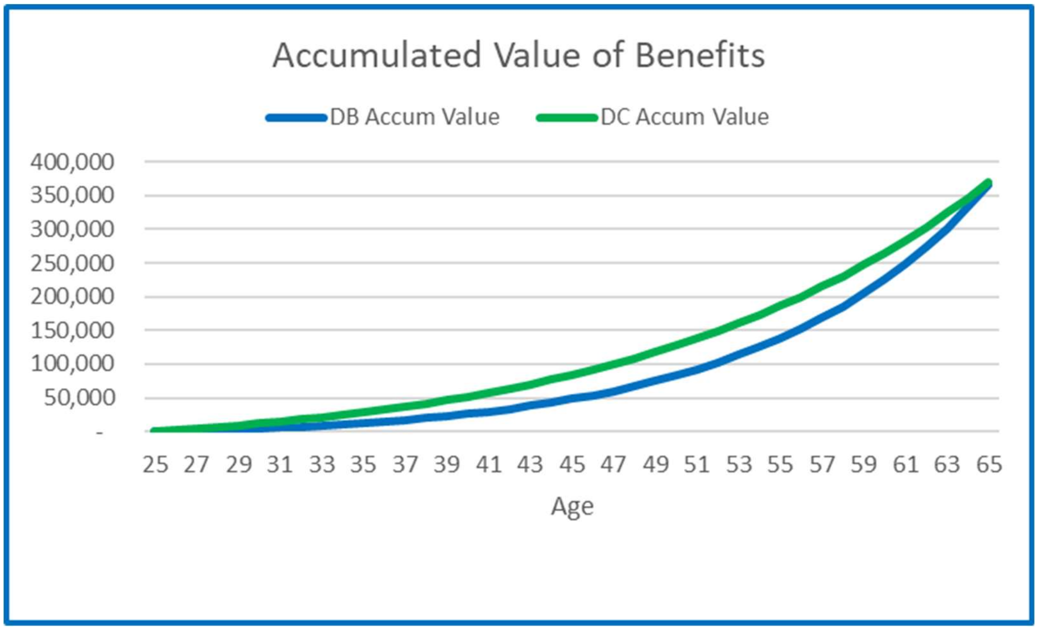
- Traditional defined benefit plans
- Variable annuity plans
- Variable accrual plans
- Cash balance plans
- Defined contribution plans

In this introductory paper, we will discuss the differences between DB and DC plans and the underlying risk profile of each plan.

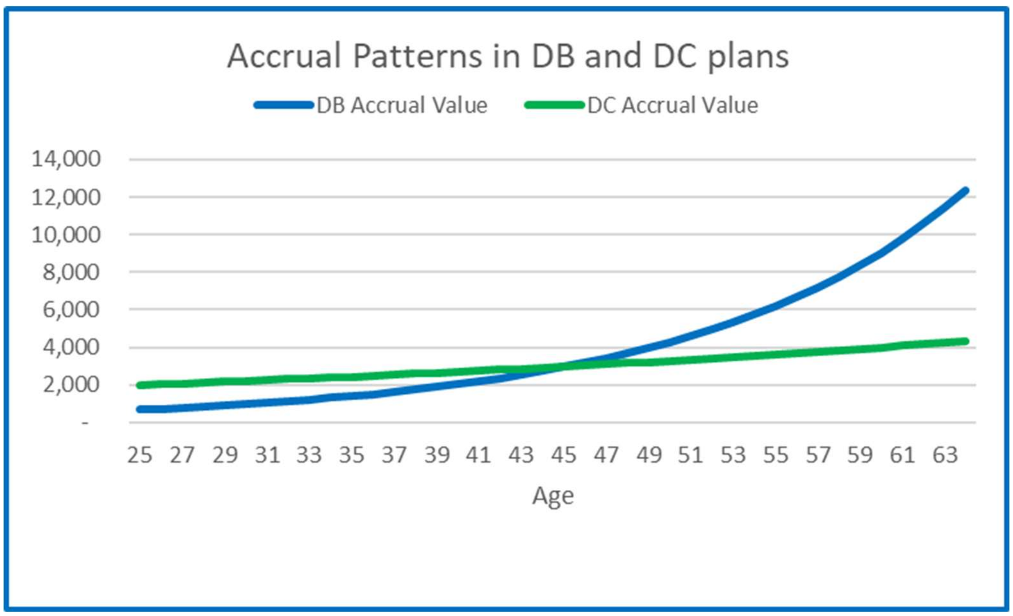
What Happens During the Accrual Years?

Let's begin by comparing a DB plan that provides a benefit of 1% of each year's pay to a DC plan that provides a contribution of 4% of compensation. To compare the value of these amounts, we will use a 5.50% interest rate and the mortality table used by the IRS to convert annuities to lump sums for 2023. We further assume an employee is hired at age 25 with an annual salary of $50,000 and an expected salary increase of 2.0% per year.

As you can see in the chart below, these two plans are expected to provide the same value in benefit to this sample person.



While the plans provide the same value of benefit for this sample person, the way the plan accrues the value of benefits during a person's career is very different. The chart below shows the value of benefits accrued in each year.



You can see in this chart the DC plan is better in the early years as the accruals in the DC plan will be invested in the market for a longer time which allows for more investment income. The DB plan is better for older workers as the value of the annuity benefits being accrued is much higher.

So, when considering which type of plan an employer wants to implement, a careful review of these accrual patterns should be considered. If you start with a DB plan and then later change to

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a DC plan, the mid-career workers get hurt the most as they received the lowest value accruals in the DB plan they started with and will get the lowest value DC accruals at the end of their career. This group may struggle to attain a comfortable level of retirement income.

While some of this deficit can be mitigated through plan design and using some type of age or service weighting to the contribution rate in the DC plan, the limited amounts that can be contributed to a DC plan will likely prevent the DC plan from keeping this group whole.

Other considerations when considering a change from a DB plan to a DC plan are increased costs in other benefit programs. For example, if employees are not able to retire, they will have to continue working which may lead to less productivity in the workforce. If the work is physically demanding then more disability claims may be incurred and healthcare costs may rise.

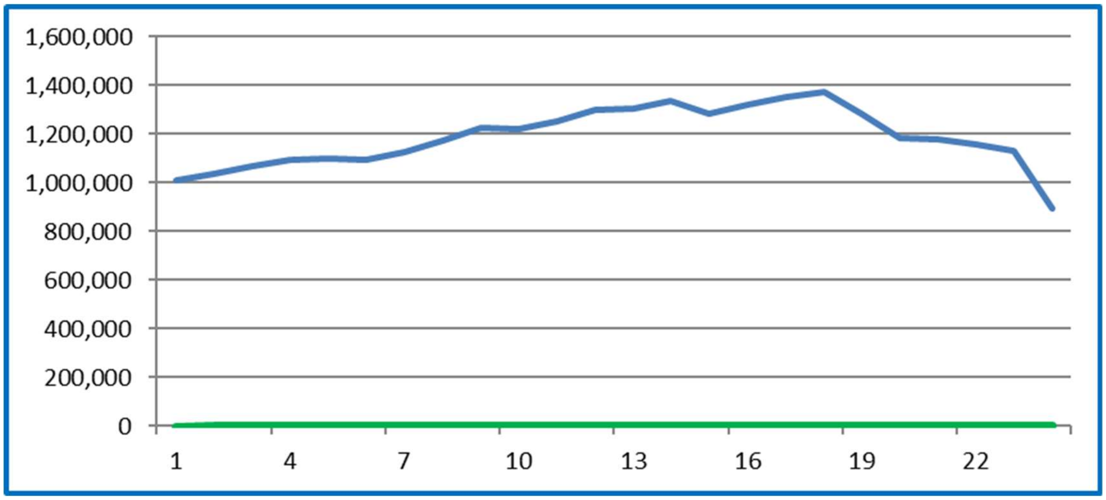
In addition, the change increases the level of risk in the plan and passes it to the participants. The elevation in risk comes from removing the risk pooling. In the DB plan, mortality risk is pooled and, therefore, much more easily managed. In a DC plan, the individual mortality risk is significant and not something individual workers can manage without significant cost. Another consideration is the investment risk. A large DB plan is professionally managed and has access to some investment opportunities that are not available to participants in a DC plan. The investments also have to be managed by individuals who may not have the proper training to manage a DC plan account.

What Happens After Retirement?

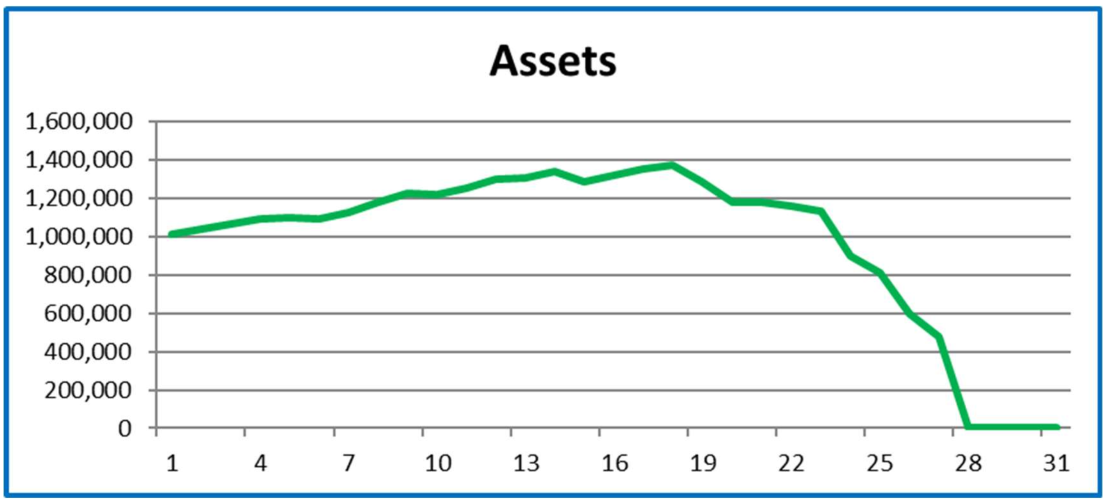
After retirement with a DB plan, participants will receive a check every month for as long as they live. They can compare this monthly income (along with Social Security and other income sources) with their expected monthly living expenses. This will give them a good idea as to whether or not they have enough income to retire.

After retirement, with a DC plan, participants will need to project out their retirement account along with their expenses and expected investment income. The unknowns create a lot of volatility and uncertainty in these projections beyond just a few years. From these projections, the participants need to determine if they have enough income to live out the rest of their life. In many cases, simplified projections are provided to participants which estimate if they have enough money for their expected lifetime. These projections can lead to decisions being made with incomplete or inadequate information which may lead to more problems for the participants. In the chart below we show a sample projection over a participant's expected lifetime and then a projection through the time when assets are depleted.

The following chart takes a sample individual with $1 million in retirement savings and projects out the account balance. If the projections stop at their expected lifetime (24 years in this example) then it seems like the individual will have enough money to retire and after 24 years will have roughly the same amount of money they started with when they first retired.



So, what if the individual lives longer than 24 years? The chart below shows how rapidly assets can fall later in retirement as the effect of inflation takes over. In this case, someone living just an extra 5 years will have no money left.



Summary

As you can see, defined benefit and defined contribution plans work very differently and have many different features. The best plan for any given employer will be different based on what their needs are and the types of people that are employed.

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We list below some of the various pros and cons for each plan type:

Defined Benefit Plans

Pros	Cons
• Help attract and retain long-service employees • Investment and mortality risks are pooled • Ensures lifetime income • Enables participants to perform basic retirement planning – match up monthly expenses with monthly income • Can provide early retirement and disability benefits	• Not valued in industries with high turnover • Cost volatility can be significant if not managed properly • Risk predominantly lies with sponsoring employer • Annuity benefits are not always appreciated and understood by participants

Defined Contribution Plans

Pros	Cons
• Employees can control their own investments • Portability • Employees understand how the value of their account grows better than they understand the value of an annuity • Risks are transferred from the plan sponsor to the participants	• Unable to provide enhanced disability or early retirement benefits • Account leakage due to loans and hardship withdrawals • Employees do not understand how to spend down their retirement account and do not know if they have enough money • Risk level is also increased due to lack of risk pooling

Many options are available in each of these plan designs and now there are many different types of plans that fit between these two extreme ends of the retirement plan spectrum.

In future papers, we will discuss the risk factors in the various plan designs, options regarding plan features, and how to mitigate risk in any of the plan designs that an employer may be interested in.

Contact Us

If you have any questions or comments regarding this paper, please feel free to reach out to Richard Hudson at RHudson@factuarial.com or 212-395-9555 x117. We would love to hear about other real-life issues and use them to add to our information and share with the public.