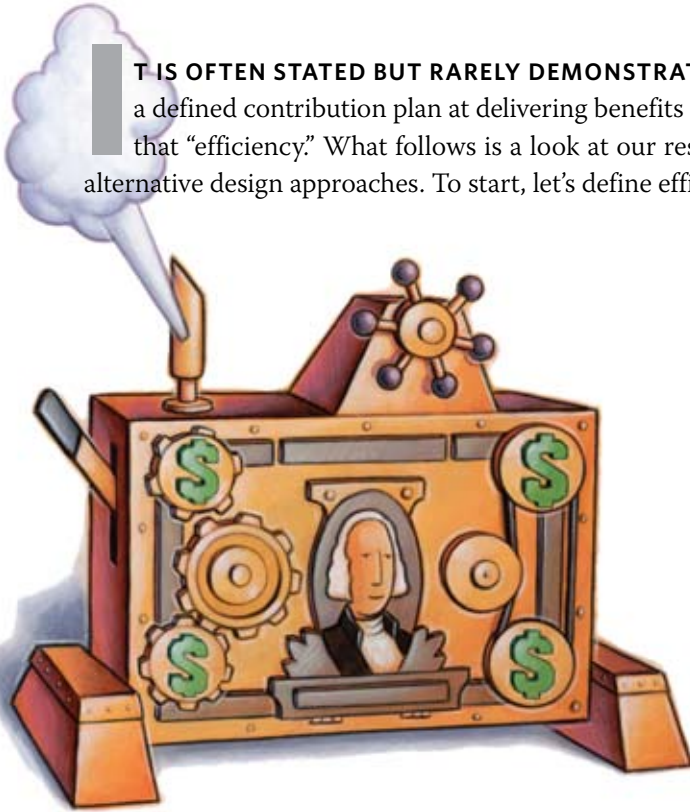


How Efficient Are Retirement Programs in Delivering Dollars to Retirees?

IT IS OFTEN STATED BUT RARELY DEMONSTRATED that a defined benefit plan is “more efficient” than a defined contribution plan at delivering benefits to retirees. A client recently challenged us to quantify that “efficiency.” What follows is a look at our response to that challenge and an expansion to several alternative design approaches. To start, let’s define efficiency:



- A plan’s *efficiency* is measured by the portion of its assets that are delivered to those retiring from the workforce, as opposed to those leaving before retirement.
- A plan’s *efficiency index* is the percentage of assets, on a present-value basis, delivered to employees who retire from the sponsor.

There are two main reasons why one retirement program would be more or less efficient than another. These are:

- *Benefit design*, or the pattern of how benefits accrue as the employee ages. We see the most employee turnover at younger ages and at shorter service periods. If these employees have earned relatively large benefits and leave with them, the plan is less efficient.
- *Investment returns*. If employees invest the plan’s assets (as they do in most 401(k) plans), they’re likely to achieve returns below those of professional money managers. Other factors affecting efficiency include plan expenses and investment approaches. This is a closer look at design and returns.

Benefit Design

To investigate the impact of benefit design and plan accrual rates, we looked at the benefits that are paid to employees in the employer’s current plan. A few plan details: The plan is a final-average-pay plan that provides a benefit equal to 1.5 percent of the employee’s final five-year average salary for each year of service. If the employee leaves before eligibility for retirement, the resulting benefit is deferred to 65. However, if the employee retires from service at age 55 or later, the benefit is payable immediately and reduced only 2 percent per year for each year before age 65. No benefits are paid if the employee leaves before five years of service; the benefits vest at five years.

To come up with an efficiency index for the plan, we

TABLE 1

Age	Number Retiring	Age	Number Retiring
55	50	60	43
56	24	61	20
57	23	62	199
58	23	63	60
59	22	64	54
		65	482

TABLE 2

Age	Value of Benefit Paid Out
25-29	1.1%
30-34	3.7%
35-39	5.1%
40-44	5.8%
45-49	5.7%
50-54	8.5%
55-59	16.0%
60-64	54.1%

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TABLE 3

Age	Benefit Paid Out
25-29	6.5%
30-34	17.1%
35-39	16.3%
40-44	12.9%
45-49	8.9%
50-54	6.5%
55-59	8.6%
60-64	23.2%

TABLE 4

Age	% of New Hires
Up to age 25	18%
25-29	20%
30-34	16%
35-39	14%
40-44	12%
45-49	10%
50-54	6%
55-59	3%
60-64	1%

TABLE 5

Plan Design	Efficiency Index
Defined benefit—final average pay, subsidized early retirement	80
Cash balance—level contribution	57

TABLE 6

Type of Plan	Provisions	Vesting Period	Efficiency Index
Defined benefit	Final average pay, subsidized early retirement	5	80
Defined benefit	Career average	5	76
Cash balance	Flat contribution	5	57
Cash balance	Contribution increases with service	5	60
Defined contribution	Flat contribution	Immediate	45

make several assumptions about the population and how employees will act over time. We assume that pay will increase 4 percent per year, and we used 8 percent to discount present values. Turnover is modest; mortality and disability tables are reasonable standard tables. Retirements are assumed to occur between 55 and 65. For 1,000 employees currently 55, the number retiring at each age is shown in Table 1.

Let’s look at a 25-year-old employee making \$40,000 annually (though the result doesn’t depend on salary in this example). Using the above assumptions, Table 2 shows the portion of assets, on a present-value basis that the trust will pay at each future age.

Thus, 70.1 percent of benefits (16.0 percent + 54.1 percent) are expected to be paid to the participant when he leaves after age 55.

Cash Balance Plan

Now let’s look at a cash balance plan that provides approximately the same benefit at age 65. Using our assumptions, one plan that comes close provides a benefit credit of 10.7 percent of pay each year. Prior credits are granted a 5 percent interest adjustment. At age 65, this plan provides almost the same value to the employee as the 1.5 percent of final average pay mentioned above.

For this 25-year-old employee, benefits accrue much more quickly under the cash balance plan. In fact, the pattern of accrual looks as follows. The big jump in the defined benefit plan occurs when the

employee attains age 55 and gets the early retirement subsidy. If there were no subsidy, the pattern would be similar, without the jump, and the lines would converge at age 65, as shown in Figure 1.

Thus, if the employee retires any time before age 55, the employee receives more from the cash balance plan than from the defined benefit plan. Table 3 shows the pattern we calculate, assuming a five-year vesting requirement.

Thus, the cash balance plan pays out only 31.8 percent of its benefit at age 55 or later for an employee who enters at age 25.

An interesting aspect of the cash balance plan is the interplay between credits earned each year and the interest rate on prior credits. If this plan used an 8 percent interest rate (rather than 5 percent in the example), the credits themselves would have to be only 4.93 percent (rather than 10.70 percent). Such a plan would pay out 40.3 percent of its benefits after age 55.

The Efficiency Index

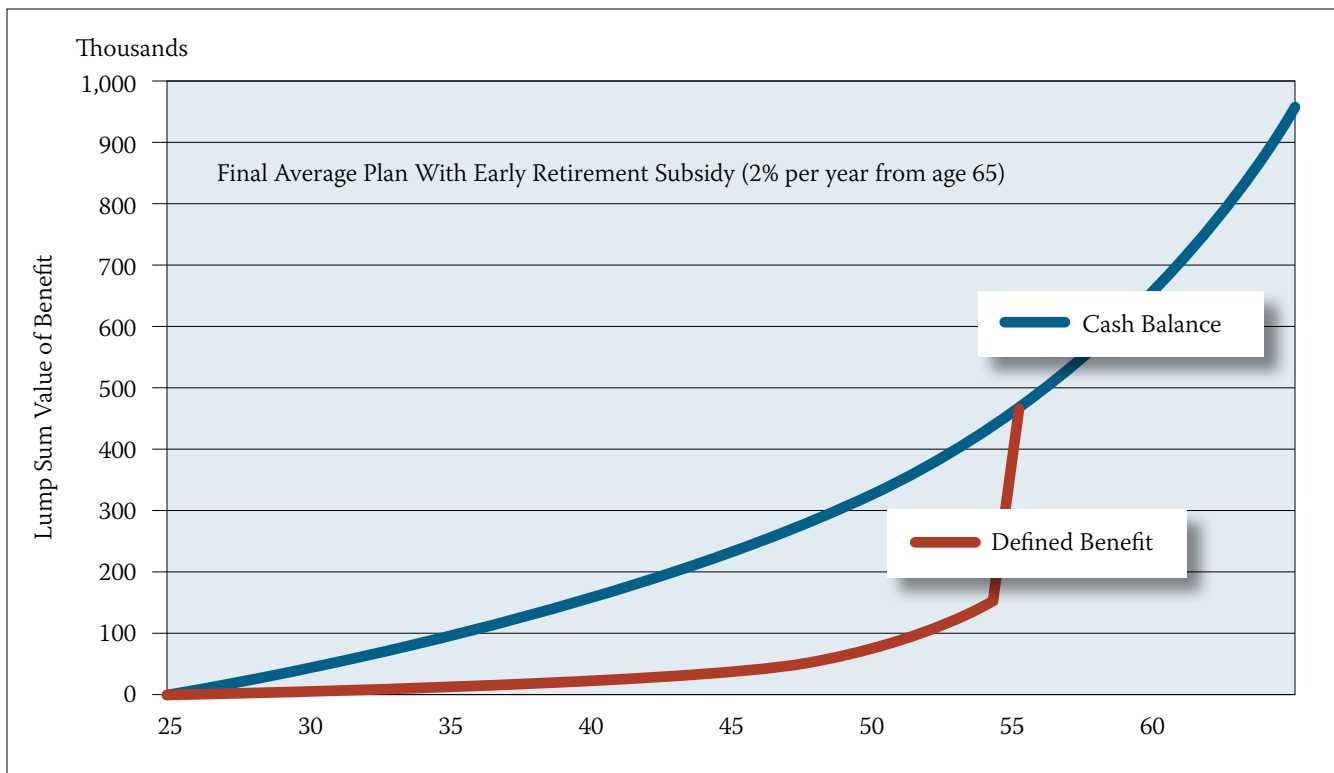
To determine an efficiency index for a plan (as opposed to an individual), we have to look at all the employees within that plan. Not all employees start at age 25, and the later an employee starts, the more likely that employee is to remain until retirement and the more efficient the plan is in providing his or her retirement benefit. For this particular plan, we determined that employees entered the plan at the ages shown in Table 4.

Applying this entering population to the two plans above, we determine the value of expected payouts for the entire population. The percentage of benefits paid to employees working until retirement is the efficiency index as shown in Table 5.

That is, for every dollar paid from the defined benefit final-average-pay plan, on average, 80 cents goes to a retiree. From the cash balance plan, only 57 cents goes to the retiree. The rest goes to employees who leave before retirement.

If the plan had immediate vesting, the efficiency index of the cash balance plan would drop to 53 since the plan would pay

FIGURE 1



benefits to employees who leave during the first five years.

The Second Source of Inefficiency

If we look at true defined contribution plans, we find a second source of inefficiency. Generally, employees invest less well than professional managers. There is an anecdote about the Nebraska Public Employees Retirement System in which two groups of employees received retirement benefits, one group through a final-average-pay plan, the other through a defined contribution plan. Between 1983 and 1999, the defined contribution group had achieved an investment return that was 500 basis points (5 percent) less than the professionals who invested the defined benefit assets.

That result seems extreme and occurred during a period of high market returns; other studies put the difference closer to 100 basis points (1 percent). Even this has an important effect: If a professional money manager can earn 8 percent and an employee-driven plan can earn 7 percent, the former plan will be able to deliver ap-

proximately the same benefits with only 85 percent of the contribution. Assuming immediate vesting in the defined contribution plan, its efficiency index will be 45.

Table 6 shows efficiency indices calculated for several types of retirement programs.

What does this mean to a plan sponsor? There are some simple observations that can be derived from this efficiency analysis.

- For a given contribution level by the employer, the highest benefit for actual retirees will be achieved in a plan that has the highest efficiency index.
- For a given retirement benefit, the employer will incur the lowest cost in a plan with the highest efficiency index.
- The most efficient common plan design is a final-average-pay defined benefit plan.
- In a cash balance plan, it's more efficient to have a lower benefit credit rate and a higher interest credit.
- Efficiency is more strongly influenced by the pattern of benefit accrual than the difference in returns achieved by employees.

This analysis is done from the viewpoint of an employer. The employee and society as a whole don't have an efficiency loss when an employee moves from one plan to another. In fact, employers benefit when they hire employees who worked for an employer with an inefficient plan since those employees will have had more of their retirement needs met by others.

The efficiency index will vary for a given plan based on the assumptions used to determine the present values. Generally, however, these results say a company is best served by providing a final-average-pay plan for its employees. This isn't only true because of the efficiency of financing the benefit but also because it allows an employer to design the benefit to replace income lost at retirement. It's unfortunate that accounting rules and funding requirements have made these types of plans very difficult to maintain.

However, cash balance plans are significantly less efficient than final-average-pay plans. Sponsors considering changing to a cash balance plan might want to consider this effect.