A Pension Benefit Allocation Using Widget Accounting

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Abstract

The paper solves the pension benefit allocation problem using an extremely simple accounting approach. The suitability and limitations of the approach are discussed, including its suitability for post-service medical benefits.

Introduction. In two earlier papers (Giesecke, 1994 and Giesecke, 2001) I looked at pension benefit allocation (or attribution) schemes. The allocation scheme determines how the pension benefit at each exit point is allocated back to the individual years of service. There are any number of ways of doing this, but in those papers I emphasized how the pension benefit is seen by the potential pension recipient. Here I take a different approach and consider an analogy with accounting principles that could be made for a machine. For lack of a better term, I call this widget accounting.

Widget Accounting. Suppose we are planning to buy a machine that makes widgets. Let us suppose we know already how many widgets will be made each year in the future for a machine we are going to buy. After a certain number of years the machine will be scrapped. Let us suppose also that the present value of the floor space and maintenance for that machine has been added to the price, and the present value of scrap value subtracted. The question is how do we write off the net cost of the machine.

One approach is to say that the allocation of the cost is equal across all widgets. So that if the lifetime of the machine is n widgets and the net cost of the machine is W, the allocation at time of purchase for each widget is simply W/n.

This allocation has the unfortunate consequence that the charge at the end of year y for a widget would be given by

Cost per widget at the end of y = (W/n) * (1+i) ^ y, where i is the interest rate.

The cost at the end of a particular year is the allocated cost plus accumulated interest. Because of this the cost per widget in year y+1 is the cost in year y, multiplied by 1+i. So if this accounting is used to set the price, the price would be relatively low in the early years and relatively high in later years, other things being equal. Or if the accounting only determines the profit, the price being set by other market mechanisms, the profit would be relatively high in the early years and relatively low in the later years.

The way to remedy this defect is to assume that the cost per widget should rise each year by the rate of inflation. The advantage of this is that an old machine could compete with a new machine, and vice versa, other things being equal. Also it could be claimed that for tax purposes the allocation of the profit or loss between early years and later years would favor neither the government nor the company. In this case we would have

$$Cost\_per\_widget\_in\_year\_y = \frac{W}{\sum_j \left(n_j \frac{(1+c)^j}{(1+i)^j}\right)} \frac{(1+c)^y}{(1+i)^y}(1+i)^y \qquad [1]$$

where c is the rate of inflation
n_j is the number of widgets to be produced in year j.

Here I assume, for the sake of simplicity, that the costs for the year are determined at year-end. (Using smaller units can, of course, circumvent the inaccuracy this introduces.) The last two terms with $(1+i)^y$ cancel. One such term is given as the denominator where $(1+c)^y$ is the numerator, to show that their ratio is an instance of the terms in the summation, and, thus, that at time zero, all of W gets allocated. The cost in any given year is then the allocated cost at time of purchase plus the accumulated interest.

It may also be seen that the unit cost at time of purchase is W divided by the summation and that each year the unit cost goes up by the inflation rate c.

The widget accounting approach may be summarized as follows. First, we identify the relevant units of production. Second, we allocate the cost in such a way that the unit cost goes up with inflation. Third, the cost allocated to a particular year accumulates from the time of purchase with interest until it is paid for in a particular year.

Another way of looking at this is to say that at time zero, the benefit is allocated by the present value of the number of units to be produced each year in the future, but using real (rather than nominal) interest rates in the present value computation. Note that this is a consequence of the decision to force the unit cost to go up with inflation. It is not a separate principle.

We want the unit cost to go up with inflation, because, if it does not, the pricing and profit pictures become distorted. This very simple accounting approach is the heart of this paper. So the reader may want to consider its strengths and limitations before proceeding. In the next section I will try to see how it could be applied to pensions.

Pension Allocations Using Widget Accounting. Again let us treat each exit point separately and allocate the benefit across those who may reach that exit point.

For this analogy let us treat each person as we would a machine. Let us assume that the units of production of that person-qua-machine can be measured by the inflation-adjusted salary. So the units of production for the N_j persons at the end of year j, with nominal salary S_j paid at the end of year j, would be

$$\frac{S_j N_j}{(1+c)^j}$$

This could be substituted for n_j inside the summation in equation 1. So the summation would then look like

$$\sum_j \frac{S_j N_j}{(1+i)^j}$$

So we would, in effect, be allocating the pension benefit by the present value of salary. Note we are still measuring the cost at time of entry.

There is, as it turns out, a pension cost method that does this, or very nearly so. The method, the entry age normal (EAN), pays for the benefit as a constant percentage of pay.

How would this method be described in our analogy with widget accounting? Entry age normal seems to follow the accounting principle correctly. It provides an allocation where the price for each unit of production– as measured by inflation-adjusted salary–goes up with wage inflation.

The machine analogy is not perfect for EAN, however, because we are allocating the benefits at particular exit points to persons not expected to reach those exit points. This would be analogous to allocating the cost of a machine to phantom units of production where we expect the machine will not be used.

The obvious way out of this difficulty is to allocate the pension at exit point z across the units of production of those persons expected to leave at exit point z. This is given by

$$\frac{S_j N_j \, {}_z q_j}{(1+c)^j} = \frac{S_j N_z}{(1+c)^j}$$

where ${}_z q_j$ is the probability of receiving a pension at exit point z and N_z is the number of persons expected to receive the benefit. This could be substituted for n_j inside the summation in equation 1. Then the summation would then look like

$$\sum_j \frac{S_j N_z}{(1+i)^j}$$

So we would, in effect, be allocating the pension benefit by the present value of the product of salary and the probability of receiving a pension at exit point z. This approach still uses inflation-adjusted salary as a measure of production, but only considers those units of production that are expected to lead to a pension at a particular exit point.

By this approach we are not saying that the units of production (as measured by inflation-adjusted salary) that do not lead to a pension are not legitimate units of production. We are saying, rather that they are irrelevant. They are not the units of production for which the pension represents deferred compensation. So probabilistically they are excluded.

This allocation is projected unit credit with the benefit apportioned by interest-adjusted salary (PUCIAS). Rather than assuming a single exit point, however, we are assuming there would be a separate PUCIAS for each exit point. This is like the traditional projected unit credit, but instead of allocating the benefit equally to all years of service (with suitable modifications if the benefit multiplier varies by year of service) it allocates the benefit in proportion to the interest-adjusted salary for each year of service for those persons expected to retire at a particular exit point[1]. If there is only one exit point and all reach it, EAN and PUCIAS are the same. This relationship between the two methods was demonstrated by Anderson (1985, p. 153).

Discussion.

The Accounting Principle. The accounting principle is to allocate costs so that the unit cost rises with inflation. We want the unit cost to go up with inflation, because, if it does not, the pricing and profit pictures become distorted.

By calling this an accounting principle I do not mean to imply that it corresponds to current accounting practice or accounting standards. I mean simply that it best fits the general spirit of accrual accounting.

It may, nevertheless, be of some interest to compare costs determined by equation [1] with cost using a more traditional accounting standard. For its simplicity, I will use International Accounting Standard 16 (International Accounting Standards Committee, 2000), which covers property, plant, and equipment. In the summary to IAS 16 we find:

> "Initial measurement should be at cost. Subsequently, the benchmark treatment is to use depreciated (amortised) cost but the allowed alternative is to use an up-to-date fair value. Depreciation: … 2. Depreciation base is cost less estimated residual value. 3. The depreciation method should reflect the pattern in which the asset's economic benefits are consumed by the enterprise. 4. If assets are revalued, depreciation is based on the revalued amount."

Now consider the cost of a machine for year y using equation [1]. This is shown in equation [2]. Compare this to the cost of the machine that is annually revalued under

[1] For PUCIAS, I am assuming, there would be no modifications if the benefit multiplier varies by year of service, since each exit point is handled separately.

IAS 16 and under the conditions where our inflation assumption has been met and the residual value is otherwise related to the number of units produced. This is shown in equation [3].

$$Cost\_of\_machine\_during\_year\_y = \frac{W(1+c)^y}{\sum_j (n_j \frac{(1+c)^j}{(1+i)^j})} n_y \qquad [2]$$

$$IAS16\_Cost\_of\_machine\_in\_year\_y = \frac{W(1+c)^{y-1}}{\sum_j (n_j)} \sum_{j=y}^{z} n_j - \frac{W(1+c)^y}{\sum_j (n_j)} \sum_{j=y+1}^{z} n_j \qquad [3]$$

The first term of equation [3] represents the inflated value of the machine at the beginning of the year, adjusted for the number of units it can still produce. The second term gives the end-of-year value. The summation is to *z*, which I define here at the last year in which a unit will be produced.

Equation [3] represents the difference between the beginning-of-year and end-of-year revalued assets. Because of this equation [3] can be negative in years where few units are produced and the inflation is high. However, the sum of equation [3] across all years is equal to W.

For equation [2], on the other hand, the sum across all years is larger than W. It is its present value that is equal to W.

Equation [4] gives the difference between equation [2] and [3].

$$Equation\_2\_less\_eqn.\_3 = \frac{W(1+c)^y n_y}{\sum_j (n_j \frac{(1+c)^j}{(1+i)^j})} + \frac{W(1+c)^y}{\sum_j (n_j)} \sum_{j=y+1}^{z} n_j - \frac{W(1+c)^{y-1}}{\sum_j (n_j)} \sum_{j=y}^{z} n_j \qquad [4]$$

The difference will be zero if both the inflation and interest rates are zero. If the inflation is zero but the interest rate is not, the first term will exceed the sum of the second and third term. This is because equation [2] is paying for the allocated cost at time of purchase plus interest. Normally in accounting practice this would show up as a mixture of profit and interest expense. So equation [2] is providing something that would be more appropriate for a rental-equivalent cost, rather than something we would expect to find in day-to-day accounting practice.

It should be noted also that equation [4] will not be zero if interest is zero and inflation is not. This is because equation [3] does not quite succeed in making the unit cost go up with inflation. Nevertheless, it seems obvious that the goal of revaluing assets is to approximate this. For this reason, I think I can still claim that equation [2] better fits the general spirit of accrual accounting, at least, in so far as it gives us a rental-equivalent cost. Of course, traditional accounting practice must deal with actual costs retrospectively in a way I have conveniently ignored here. Moreover, it must separate profits from interest expense, which I have also conveniently ignored.

Arguments that Favor PUCIAS. So far I have made what I think are three reasonable assumptions. They are:

1. that the cost of the retirement system at an exit point should be allocated to the units of production in such a way that the unit cost goes up with inflation,
2. that inflation adjusted salary can be used as the appropriate measure of production, and
3. that we can ignore the units of production that probabilistically do not lead to a pension at a particular exit point.

This results in the use of PUCIAS as the allocation method. As it turns out, there are several other arguments that favor PUCIAS. They are summarized below. In the next section I will mention a number of caveats.

The first three arguments depend on what I have called perceived-value allocations. There are two types of perceived-value allocations. The first type depends on estimated lump sums (Giesecke, 1994). The lump sum here is the incentive that an employee would need before giving up all rights to a retirement benefit from the current employer at a specified future exit point. This incentive is something an outside employer might offer, for example, to lure an employee away from the current job, assuming no vesting. By using the interest-adjusted difference between successive lump sum—still looking forward to a single exit point—it is possible to get a perceived-value allocation of the benefit for that exit point. In the 1994 paper I evaluated it for an employee who is (1) at the margin between leaving and staying and (2) is considering outside employment with identical pay up to the same exit point being evaluated. Under these conditions, if the employee (3) uses the employer's investment rate of return and (4) will receive a defined contribution benefit with the new employer, the resulting allocation is PUCIAS.

That PUCIAS is the implicit allocation we get under the assumptions in the preceding paragraph is an argument in its favor. However, if we change assumption (4) so that the pension benefit of the outside employer is a final-pay defined benefit plan, the resulting allocation is traditional projected unit credit (PUC), so long as the benefit-per-years-of-service multiplier is constant. That is an argument in favor of PUC.

If the employee's personal discount rate is higher than the employer's investment rate of return, then the resulting lump-sum allocation (under realistic assumptions) was more back-loaded than PUCIAS. However, one could also claim this as an advantage for PUCIAS over EAN, since PUCIAS is more back-loaded.

The second argument is reinforced using a completely different type of perceived-value allocation (Giesecke, 2001), but one still based on personal discount rates. In this approach we assume an employer is adding a defined benefit plan where there previously was none. The employer tries to pay for the benefit by lowering salaries in such a way that no employee feels he or she is losing anything in terms of the present value of future salary and pension. An employee's present value of future benefits is increased by having the retirement benefit, but is decreased by having reduced current or future salary. The pension is seen as a substitute for salary. So we allocate the pension benefit based on the interest-adjusted value of those salary reductions. If all employees' personal discount rates equal the employer's investment rate of return and taxes are not a factor, it does not matter to a new entrant where the employer lowers salaries. The new entrant would not care. Also mid-career employees would be indifferent between future salary reductions and pension increases that are actuarially equivalent. If, however, employees at various lengths of service have personal discount rates higher than the employer's investment rate of return, not all the benefit can be allocated, but what is allocated tends to be at high lengths of service. The solution to this can be found using a stepwise procedure that tries to allocate as much of the benefit as possible without any employee feeling he or she has lost anything. It is possible to continue the stepwise procedure beyond the point where no employee feels he or she is losing anything until all the benefit is allocated, but still in such a way as to diminish the perceived impact. The result is also more back-loaded than PUCIAS. But again we can see this as an argument in favor of PUCIAS over EAN in that it is more back-loaded.

These three arguments are not as straight forward as the widget argument, but they lend support to it.

There is a fourth additional argument mentioned in Giesecke (1994): namely, that PUCIAS has an appealing funding philosophy. The benefit at a particular exit point is allocated by the interest adjusted salaries of those persons expected to reach that exit point. So the pension represents a form of deferred compensation that is related to pay.

Caveats. Now for the caveats. First, it should be clear that neither PUCIAS nor widget accounting as typified by equation [2] is an approved funding method. I will discuss this in the last two sections of the paper.

Second, the advantages of PUCIAS presume we are using multiple exit points, with each exit point being allocated separately as suggested by Atteridg et al. (1991). If, for practical purposes, there really is only one exit point, then this caveat is not needed, but if a single exit point is assumed in order to give an approximate allocation for what in reality is multiple exit points, then any advantage of PUCIAS is not clear.

A third caveat is mentioned in Giesecke (1994). For an employee who works long enough, the present value of the retirement benefit may actually decrease at high years of service. When that point is reached, Giesecke (1994) suggests using traditional unit credit—*not* traditional *projected* unit credit, but traditional *unit* credit. This caveat needs some discussion, which will be given in the next section.

A fourth caveat is that salary may be an imperfect measure of production.

Finally, the earlier papers (Giesecke, 1994 and 2001) also have some further caveats to the backloading-is-better argument. The most notable is that they do not consider the effect of taxes.

Widget Accounting at Late Years of Service. For an employee who works long enough, the present value of the retirement benefit may actually decrease at high years of service. Widget accounting would still give positive accruals, in this case, because there are still future exit points. The same could be said for PUCIAS or PUC where multiple exit points were used.

Clearly an astute employee would see his retirement benefit as shrinking, however. And perhaps the employee would see high salary or some other features of the job as offsetting this loss. So, in the author's opinion, we should ideally recognize negative accruals for these high years of service.

This view is consistent with, or at least easily reconciled with, a lump-sum type of perceived-value allocation. Under a lump-sum type of perceive value allocation an employee at a particular length of service has a perceived-value (or lump sum) associated with each potential future exit point. When the lump sums for future exit points are multiplied by their probability and summed, that sum may be compared with a lump sum associated with leaving at the current length of service. If the interest-adjusted sum for future exit points is less than the lump sum for leaving now, the employee thinks that he is losing something by continuing his employment.

To accommodate this in a lump-sum perceived-value allocation, we could pretend that this exit point—after which accruals are negative or quite small—is the final exit point when viewed from earlier years of service. So from the point of view of the earlier lengths of service there would be no normal costs for exit points beyond this transition exit point. Accruals beyond this transition exit point would then be small or negative, and would based on a traditional unit credit approach.

To reconcile negative accruals in a salary-reduction type of perceived-value I suggested (Giesecke, 2001) using the same transition exit point that we would use for a lump-sum perceived-value allocation. Again unit credit would be used beyond the transition exit point. From Giesecke (1994) there were two tests for that exit point. First, the employee must be retirement eligible. Second, the present value of future normal cost contributions under unit credit must have reached the point at which they are negative or less than the present value of future normal cost under PUCIAS. One could probably devise a scheme to substitute some sort of salary-reduction allocation for the projected unit credit here mentioned in the second test. This is more difficult than it sounds, because there is not a unique way of dealing with multiple exit points in a salary-reduction type of perceived-value allocation. Nevertheless, negative accruals at high lengths of service are not, in principle, counter to the spirit of a salary-reduction type of perceived-value allocation.

For widget accounting, PUC, or PUCIAS, this does not appear to be the case. The obvious question is whether this is a weakness of these allocation schemes or a weakness of the perceived-value approaches. Widget accounting tries to allocate the cost across the units of production. Perceived-value allocations, on the other hand, try to convert the benefit to something that is perceived as the equivalent of a lump sum or a salary.

In the author's opinion, the perceived-value approach has the more compelling argument. If an employee has reached the point where the above two tests can be met, the employee really does see the pension's decrease in present value as an offset to salary. It is a disincentive to continued employment. So, if we accept this reasoning, the positive allocation of the benefit should go to individual years of service prior to the transition point except possibly for a small positive, traditional-unit-credit allocation beyond the transition point. The resulting allocation is salary-like in that it directly reflects the employee's motivation for leaving or staying. Widget accounting is cleaner than this, but its justification is not as sound, at least not in my opinion.

Widget accounting, nevertheless, provides a reasonable allocation prior to the transition exit point. In fact, unless, we are using some sort of perceived-value allocation, widget accounting may be the best we can do.

PUC vs. PUCIAS. Is there anything that can be said about projected unit credit (PUC) from the point of view of widget accounting? There are. From the point of view of widget accounting PUC makes two mistakes. First, it assumes that the units of production are the same in all years. Second, the cost for those units increases with interest rates, rather than with inflation.

The two mistakes go in opposite directions. The units of production are funded so that the costs go up with interest rates rather than with inflation. This would tend to back-load the benefit (i.e. we would tend to pay for it more in late years of service rather than early years of service). However, this is offset by the definition of units of production, which would tend to front-load the benefit.

To see which of the two is more back-loaded overall let us substitute the PUCIAS definitions of n_y into equation [2]. This gives

$$PUCIAS\_cost\_during\_year\_y = \frac{\frac{B_z N_z}{(1+i)^z}}{\sum_j (\frac{S_j N_z}{(1+i)^j})} S_y N_z = \frac{\frac{B_z N_z}{(1+i)^z}}{\sum_j (\frac{S_j}{(1+i)^j})} S_y . \qquad [5]$$

Here the W of equation [2] is replaced by the present value of the benefit at exit point z, brought back by interest to the time of entry.

The PUC cost can be computed by dividing the same numerator by z years and bringing that forward with interest to the end of year y. This gives

$$PUC\_cost\_during\_year\_y = \frac{\frac{B_z N_z}{(1+i)^z}}{z}(1+i)^y . \qquad [6]$$

Which of the two is more back-loaded depends upon whether the salary increases are larger than the interest rates. If S_y equals $S_0(1+i)^y$, the two methods are equal. If the annual salary increase (including merit and across the board) is larger than the interest rate, PUCIAS is more back-loaded. The latter result may be shown by dividing both equations [5] and [6] by $(1+i)^y$. This gives the allocation at time zero. The allocation for PUC is 1/z. For PUCIAS, let $S_y = S_0 (1+c)^y$. The present value of these terms will get larger as y increases. This is desirable from the point of view of the perceived value allocations, but not if want to build a larger fund earlier.

Like PUCIAS and unlike EAN, we should note here that PUC could be adapted to take into account the probability of reaching a particular exit point.

Also like PUCIAS and unlike EAN, we should take into account that PUC is the lump-sum perceived-value allocation under some assumptions, as mentioned above.

Unlike PUCIAS, however, PUC has the sizable advantages of being more easily implemented and being an approved funding method. The Statement of Financial Accounting Standards No. 87 (1985) prescribes PUC for many pension plans. SFAS 87 does not, however, prescribe PUC for a plan that defines a benefit that is independent of salary.

PUC is also permitted, by U.S. Internal Revenue Code Regulation 1.412 (c)(3)-1, except for career average plans. PUCIAS is never permitted since according to paragraph (e)(3) an "allocation based on compensation is not permitted."

U.S. federal government accounting standards (Federal Accounting Standards Advisory Board, 1995) are more permissive, at least in some respects. Paragraph 64 states that aggregate entry age normal should be used for pension attribution. "The plan, however, may use other actuarial cost methods if it explains why aggregate entry age normal is not used and if the results are not materially different." Presumably it would be possible to use PUCIAS (or PUC) because they do a better job of accrual accounting than does EAN.

So while PUCIAS is superior from the point of view of widget accounting, PUC has some advantages that PUCIAS does not.

Accounting for Post-Service Medical Care. There is a temptation to allocate the post-service medical benefits to all years equally, since the benefit is not related to salary. The basic argument would seem to be that persons with different pay in a given year of service, but the same post-service medical benefits and the same probability of leaving at a particular exit point, should have the same allocated cost for that year of service. This design objective leads to different results than widget accounting, but does not necessarily violate the widget-accounting argument that unit cost should increase with inflation—medical-care inflation in this case. If we modify equation [2] above to use medical-care inflation, c_m., rather than wage inflation, c, it becomes

$$Cost\_of\_post-service\_medical\_care\_during\_year\_y = \frac{W(1+c_m)^y}{\sum_j (n_j \frac{(1+c_m)^j}{(1+i)^j})} n_y \qquad [7]$$

Here W represents the cost of the medical care for persons expected to reach the exit point being evaluated, discounted by interest to time of entry. If we ignore salary, we could simply use the number in a cohort expected to reach the future exit point, N_z, as the measure of the relevant units of production, n_j.

However, widget accounting would have us use $\frac{S_y N_z}{(1+c)^y}$ for the units of production. If we accept the latter as the measure of the units of production, it's clear that widget accounting does a better job of spreading the cost over the units of production. However, this collides with the argument that persons in the same year of service and the same probability of reaching the exit point in question should be assigned the same cost, regardless of their salaries.

It is, at first, difficult to say which has the more compelling argument. However, we may help the widget-accounting argument with an analogy. Suppose we have two widget-making machines, one of which makes more units than the other. Suppose, further that the two machine have a part in common? an expensive part. Do we give up the widget-accounting arguments simply because the two machines have a part in common? Probably not.

We can, however, question inflation-adjusted salary as a measure of the units of production. Should the unit of production not include the cost of post-service medical care? Probably so. However, if we follow that route we do not know how to allocate even the pension benefit, let alone the post-service medical care. To avoid complete chaos it makes good sense to treat pension and post-service medical care costs separately. In that case, equation (7) looks more attractive with a unit of production based on the probability of retiring at a particular exit point.

Of course, as far as accounting conventions are concerned the question has been closed. Paragraph 43 of SFAS 106 (1990) states that except for plans that have benefit formulas that attribute a disproportionate share of the expected post-retirement benefit obligation to employees' early years of service, "An equal amount…shall be attributed to each year of service in the attribution period (a benefit/years-of-service approach)."

If, however, we accept inflation-adjusted salary as a measure of the units of production, there are still two important differences between post-service medical care and pension allocations. First, we want to avoid allocating the post-service medical benefits for low-salary employees onto the service of high salary employees. Consequently, aggregate methods should be used with great care here to avoid doing this.

Second, post-service medical care differs from pensions in that there are two inflation rates to worry about: wage inflation and medical-care inflation. As a consequence the inflation terms would not cancel and widget accounting would not lead to PUCIAS. If c_m is larger than c, the allocation will be more back-loaded than PUCIAS.

Again the limits of widget accounting for late years of service would seem to apply. If the post-service medical care is not deferred to an age beyond retirement, this has a radical implication. The accruals would be negative beyond the first exit point at which the member is fully eligible for post-service medical care.

Summary. The paper presents a simple accounting argument, which says that the cost for like units of production should increase at the rate of inflation. If we assume that the appropriate units of production for an employee are inflation-adjusted salary, this rationale leads to projected unit credit with the benefit apportioned by interest-adjusted salary (PUCIAS) as the appropriate funding method for pensions.

This same rationale can be extended to post-service medical care funding. For post-service medical care, however, the rationale does not lead to PUCIAS, since the rates of inflation for medical care and salary do not cancel. There is also a question whether inflation-adjusted salary should be used as the units of production for post-service medical care. When it is, it is still important avoid aggregating groups with different salary and promotion patterns. When it is not, the widget accounting arguments still hold as far unit costs increasing with the rate of medical care inflation.

The widget accounting arguments do not challenge the arguments that at high years of service there should ideally be a switch to unit credit in order to permit negative accruals. These insights have not yet been incorporated into accounting standards or IRS regulations.

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