

## Mitchell's Musings 3-5-12: The Benefits of Arithmetic and the Arithmetic of Benefits

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One of the nice things about simple arithmetic is that it can often cut through seemingly complicated issues. In the past few years, there has been much controversy about deferred employee benefits, particularly in the public sector at the state and local levels. By "deferred," I simply mean benefits that are promised today but are payable in the future. The most obvious example is pensions but other benefits such as retiree health care can also be cited. Promised future benefits can be prefunded or paid for on a pay-as-you-go basis (or some mix of the two). By "prefunded," I mean that money is put aside in the current period sufficient to pay the future promises that are being made in the current period. By "pay as you go," I mean that promises are being made but are being not prefunded; they will have to be paid out of future revenue at the time those promises come due (or else the promise will be breached).

The basic facts surrounding deferred benefits are often obscured by technical jargon. My object in this musing is to lift the cloud of obscurity regarding such benefits and make a few basic points. So let's use some simple examples that capture the basic ideas of prefunding, pay as you go, and deferred benefit. And let's be clear that the numerical examples are not meant to simulate some actual pension fund or retiree health care program. Indeed, to emphasize that point, I will not characterize the values involved as expressed in dollars (\$) or the time frame in years. Instead, let's have our currency be the Talent (T) – a nice Biblical currency or valuation – and let time be measured in "periods."

There seems to be a notion embedded in the complaints about public sector benefits that *any* use of a deferred benefit is inherently an overpayment and abusive. Clearly, that does not follow logically. Pay should be set to some target level, however that target is determined. The composition of that pay, i.e., the mix of current wage and deferred benefit, can vary. For the sake of simplicity, let's suppose that the objective is to pay an employee in a certain job category at a level he/she would value at T100/period. (Perhaps the employer has determined – based on labor-market surveys - that T100 will meet objectives of recruitment, retention, and turnover.) In all examples below, we will keep the employee's valuation of pay at the target level of T100 so that there is no overpayment (or underpayment).

Now let's suppose that initially (period 1) we pay our employee entirely in current cash but in period 2 we move to a partially deferred payment scheme. Part of the pay package starting in period 2 will be a promised bonus to be paid in the *next* period (in period 3). And we continue thereafter using this mix of current cash and deferred promise, but always with the package valued by the employee at T100 each period.

In period 2 when we adopt the partially deferred payment plan, we have to make a choice: Will we prefund the promise by putting aside enough money in period 2 to pay the bonus when it comes due in period 3? Or will we use a pay-as-you-go system so that there is no cash outlay in period 2? In that case, the bonus will have to be paid in period 3 out of whatever revenue there is in period 3. Let's acknowledge that the latter pay-as-you-go approach violates the usual rule for public spending that

today's services should be paid out of today's revenue.<sup>1</sup> We might agree that pay as you go is not a Good Thing but our objective below is to determine what the consequences are *if* we nonetheless make that decision.

In order to determine how much we would have to put aside to prefund a future promise if we choose to do so, we need a discount rate, i.e., the rate we can expect to earn from one period to the next. We also need to make some assumption about how employees would value a future benefit promise. Even if they have the same discount rate for riskless future pay, they might be somewhat leery about a future promise that is not prefunded since there is a risk that the promise might not be kept.

### Five Easy Lessons

Let's start with the simplest case in which employees and employers discount at the same rate - the rate that one can earn from period to period - and the benefit is prefunded. Let's assume the discount rate is 10% per period for employer and employee. In period 1, the employee is paid entirely in current cash. In period 2, the payment is partly in the form of a promised bonus of T11 to be paid in period 3 which is prefunded. Thereafter, pay is the mix of cash and promise. The table below shows the shift in policy toward deferred bonuses out to period 5.

<b>Period</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Wage	100	90	90	90	90
Value of Prefunded Promised Next-Period Benefit to the Employee	0	10	10	10	10
Total Compensation Value to the Employee	100	100	100	100	100

Note that there is no unfunded liability in this example since the employer is prefunding. The employer puts away T10 each period starting in period 2 which fully prefunds the T11 bonus in the subsequent period. The employee values the next-period T11 promised bonus at T10 in the current period.

Now let's consider the same policy but carried out on a pay-as-you-go basis. We assume at first that the employee takes the promise of the future T11 bonus as ironclad. That is, he/she has no doubt the promise will be kept.

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<sup>1</sup> Since I want to illuminate issues facing state and local policy makers, I will avoid notions of macroeconomic stimulus that might entail running current deficits. Macroeconomic considerations are relevant at the level of the national government. The notion of current services paid out of current revenue is partly based on equity, i.e., future taxpayers shouldn't have to pay for past services they didn't enjoy. And it is partly based on economic efficiency. If labor appears artificially cheap to decision makers in public agencies because the cash required is reduced by paying workers with promises, there may be overuse of labor.

<b>Period</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Wage	100	90	90	90	90
Pay as You Go Benefit Cost to the Employer	0	0	11	11	11
Total Compensation Cost to the Employer	100	90	101	101	101
Unfunded Liability	0	10	10	10	10

In this case, the cash outlay for pay in period 2 drops temporarily from T100 to T90. But thereafter, the T11 must be paid out of current revenue. So the “saving” in period 2 is balanced by higher costs of T1/period to future taxpayers in subsequent periods. And there is an unfunded liability each period starting in period 2 of T10.

Now let’s assume that without prefunding, employees have some doubts about whether future promises will be kept. They know that the promises made in each period will be paid out of future revenue but that nothing is being put aside to guarantee that payment. Perhaps there will be a budget crisis in the future which would cause the employer to decide not to pay the promised T11. Let’s assume that absent prefunding, therefore, the employee values the promise of a next-period bonus of T11 at T9 rather than the T10 valuation of the previous example in which we assumed a belief that the promise was ironclad.<sup>2</sup>

<b>Period</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Wage	100	91	91	91	91
Pay as You Go Benefit Cost to the Employer	0	0	11	11	11
Total Compensation Cost to the Employer	100	91	102	102	102
Unfunded Liability	0	10	10	10	10

With employee skepticism about the fulfillment of the promise, the “saving” to the employer in period 2 is only T9 and thereafter future taxpayers have to pay an extra T2/period for labor services. Again, there is an unfunded liability in each period starting in period 2 of T10 since T10 in one period would be the amount needed to be set aside (but not being set aside) to fund a bonus in the next period of the promised T11.

These examples are quite simple. But they lead to the following five lessons:

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<sup>2</sup> The discount rate is thus 2/9 or 22.222...% per period consisting of a 10% discount rate and a 12.222...% risk factor.

1) *Making a promise of a deferred benefit - but not prefunding that benefit - shifts some of the cost of current services to future taxpayers.*

2) *Making a promise of a deferred benefit - but not prefunding that benefit – may reduce the value of future benefits as seen by employees due to risk, potentially increasing costs of a pay-as-you-go system to future taxpayers.*

3) *As a corollary to lesson #2, prefunding should be viewed primarily as a way of protecting employees from a breach of promise. By making the promise more credible, its value to the employee rises.*

4) *Making a promise of a deferred benefit - but not prefunding it – should not be termed a “Ponzi scheme.”<sup>3</sup> That is, pay as you go does not inherently require ever-increasing revenues. In the example above, the unfunded liability - once established in period 2 - does not increase period after period. Future taxpayers pay more each period than they would with prefunding, but the amount of extra cost per period is constant, not rising (T1 in one example; T2 in the other). There is nothing inherently unsustainable about pay as you go.*

5) *Making a promise of a deferred benefit - but not prefunding it - does not mean that employees are overpaid. Each example above adhered to the target of paying the employee an amount he/she would value at T100. By construction, the shift from cash-only pay to cash plus a promised deferred benefit did not change the T100 valuation experienced by employees.*

### **Legacy Lessons**

What about “legacy” costs? It is sometimes noted in discussions about defined benefit pensions – particularly in the context of distressed industries such as auto manufacturing – that there is a problem if the ratio of retirees to active workers rises. In such industries, there may have been a decline in the workforce over time due to a loss of market share or due to increased productivity.

Let’s note what should be an obvious point. If the deferred benefit is fully funded, the promised benefits can be paid regardless of the relative size of the current workforce to retirees. *The issue of legacy costs is irrelevant to a fully prefunded deferred benefit plan. The legacy concern arises only if there is underfunding or, at the extreme, pay as you go (no prefunding at all).* So let’s consider a scenario where we have only pay-as-you-go benefits.

We will assume that through period 3, two workers are required to do the job. In period 4, one worker is laid off and the workforce thereafter consists of just one worker. The table on the next page illustrates that example. We assume the same 10% discount rate used earlier and assume that workers value the T11 next-period bonus at T9 due to discounting and risk.

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<sup>3</sup> The essence of a Ponzi scheme is that it offers a high return to investors which can only be met by drawing in more and more investors. Eventually, the scheme collapses because it runs out of potential additional investors.

<b>Period</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Wage	200	182	182	91	91
Pay as You Go Benefit Cost to the Employer	0	0	22	22	11
Total Compensation Cost to the Employer	200	182	204	113	102
Unfunded Liability	0	20	20	10	10
Benefit Cost as a Percent of Total Compensation	0	0	10.8	19.5	10.8
Ratio: Deferred beneficiaries/active workers	0	0	1	2	1

In period 1, payment to the two workers, each receiving T100, is in cash only. In period 2, the pay system switches to the promise to each worker of T11 in the next period which each worker values at T9 (T18 for the two of them). Because of the deferred bonus promise in period 2, future taxpayers in period 3 pay total compensation of T204 including the T22 deferred bonuses. The unfunded liability in periods 2 and 3 is T20. The ratio of deferred beneficiaries to active workers in period 3 is 1. That is, two workers receive the bonus promised in period 2 and there are two active workers ( $2/2 = 1$ ).

In period 4, one active worker is laid off leaving only one worker still active. But the bonus promised in the prior period to the two workers who worked in that prior period must now be paid. So the ratio of deferred beneficiaries to active workers rises temporarily to 2. And the pay-as-you-go benefit cost rises temporarily from 10.8% of total compensation ( $T22/T204 = 10.8\%$ ) to 19.5% ( $T22/T113 = 19.5\%$ ). Once the legacy cost is paid off in period 4, the ratio of deferred beneficiaries to active workers falls back to 1 ( $1/1 = 1$ ) and the pay-as-you-go benefit cost falls back to 10.8%.

So there is a legacy cost under pay as you go if the workforce shrinks, although it is temporary and ends once the workforce stabilizes at the reduced size. But what causes the legacy cost is not deferred compensation *per se*, but rather the combination of deferred compensation *plus* pay as you go (or underfunding). Put another way, deferred compensation is a necessary, but not sufficient, factor in creating a legacy problem. Note that the legacy cost cannot be avoided by switching in period 4 to full funding in the future or abandoning any form of future deferred pay at that point. Changing the policy going forward still leaves the current debt to be paid.

What is the lesson here for state and local public employers? It is very simple. *You cannot change the past.* Switching from an underfunded defined benefit pension plan to defined contribution plan (which by definition is fully funded) does not erase the legacy costs of past underfunding.<sup>4</sup> *Any switch from a*

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<sup>4</sup> For conservatives anxious to convert Social Security (an underfunded defined benefit pension plan) to private accounts (defined contribution accounts which, again, are fully funded by design), there is also a lesson. Indeed, with the baby boom/baby bust phenomenon, there will be a rise in beneficiaries receiving

*pay-as-you-go system to a fully funded system involves a transitional cost in which you are paying off old debts plus providing full funding going forward.*

The lessons in this musing are simple enough and involve only basic arithmetic. Sadly, they seem to have escaped much of the current policy debate surrounding state and local pay and deferred pay.

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deferred benefits to active workers. However, there must be a period, unless you don't pay promised benefits, in which active workers in some fashion carry the burden of past underfunding in the transition from an underfunded pension to some other system. Beyond the arithmetic, when it comes to Social Security, a societal and not a local plan, the issues of pay as you go vs. prefunding are more complex, as we have discussed in earlier musings. Traditional societies supported the elderly through a mix of intra-family transfers and saving, i.e., through the family equivalent of a mix of pay as you go and prefunding. Social Security can be seen as a substitute for the traditional approach as the extended family was replaced with the nuclear family and single parents.