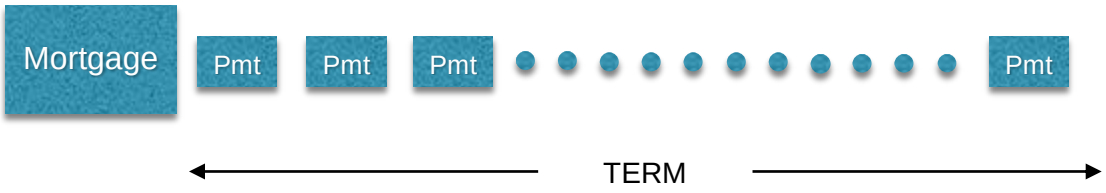
Lump-Sum Pensions and Interest Rates: How Lump-Sums Can Go Down When Interest Rates Rise

Leon C. LaBrecque, JD, CPA, CFP®, CFA

In many defined benefit pension plans, there is an option to take a lump-sum in lieu of a monthly pension benefit. In many municipal pensions, the employee contributes to the pension system and can take their contributions out in the form of an 'annuity withdrawal' as a lump-sum in lieu of a monthly payment. Frequently the calculations for annuity withdrawals use the same calculations as a lump-sum.

The purpose of this overview is to help the reader understand how interest rates, as well as other factors, can change the value of a lump-sum or annuity withdrawal. In particular, we want to discuss interest rate changes and lump-sum calculations.

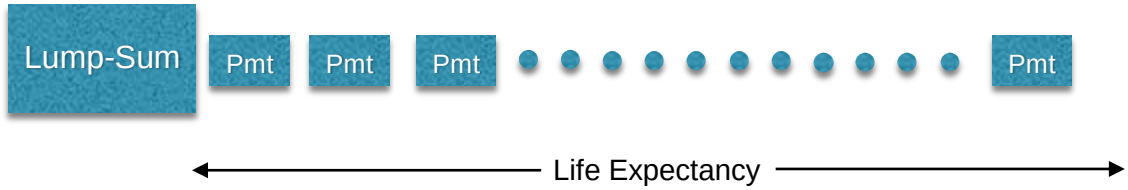
First, a simple version. Before we go into the complications, let's look at the lump-sum calculation in simple terms: think about a mortgage. In a mortgage, you make payments on the borrowed money over a period of time at a certain cost (mortgage interest rate) to you, the borrower, to pay off the loan[1].



So if you have a $100,000 mortgage loan that you want to pay off over 30 years, and the rate is 4%, the mortgage payment is $477/month. If you make each payment, the mortgage will be paid off in 30 years.

Pension math uses the same formula, except you are calculating the lump-sum based on the monthly pension payments. If you had a monthly pension of $477, the rate used to calculate the lump-sum was 4%, and the period of time you would collect the pension was 30 years, your lump-sum would be $100,000.

[1] This is called a 'present value' calculation. If you are an Excel fan, the formula is =PV.



Keep the mortgage analogy in mind, ask yourself, 'If I could only afford a $477 payment and the rates went up to 5%, what would happen to my mortgage?' Of course, we all know that you'd be able to borrow less at 5%, or about $89,000. With an increase of 1% to your interest rate, the amount that you can borrow is lowered by $11,000. In pension/lump-sum calculations, the rate is usually dictated by a specified rate (typically the 'PBGC rate' or the 'blended rate'), the payment is the monthly pension benefit, and the term is your life expectancy. We'll get into those nuances later. Here's a quick and simple illustration of how lump-sums change with interest rate changes.

Example: Willard is 58 and according to the prescribed life expectancy table, has a life expectancy of about 25 years, and a monthly pension of $5,278. If the blended rate for his age is 4%, his lump-sum is about $1,000,000. Here's how the lump sum would change with interest rate movements:

Interest Rate	Lump-Sum	Difference from 4%
4.0%	**$1,000,000**	0
4.5%	**$949,490**	-$50,510
5.0%	**$902,900**	-$97,100
5.5%	**$859,500**	-$140,500

A one-half percent interest rate increase reduces the lump-sum by $50,510, or about 5%. A 1½% rise cuts it by $140,500. It's apparent that minor increases in interest rates change the lump-sum calculation. We feel that taking a lump-sum is a personal decision, and should not necessarily be predicated on interest rate shifts. Later in this overview, we will cover the interest rate environment in mid-2017 and the outlook for prospectively higher rates, and accordingly, lower lump-sums.

A little higher-level view: Three factors. There are three factors in a lump-sum calculation: the interest rate (or discount rate), the monthly pension, and the life expectancy. The discount rate in most calculations is a blended rate per the Internal Revenue Service. This is a combination of short term (for the first five years of calculation), intermediate term (for the next 10 years of calculation, or years 5-15), and long-term rate (for the years beyond year 15). In plans that use the blended rate, which is most corporate plans like GM, Ford, FCA, AT&T, DTE, Blue Cross, etc., the rate is different at different ages. For example, under the blended rates in effect May of 2017, the rate for a 60 year old is 3.77% and for a 50 year old is 4.07%. The monthly pension is relatively straightforward and computed under the terms of the pension plan.

There is a distinction between frozen plans (like GM Ford and FCA) and active plans. In a frozen plan, the payment becomes static. In an active plan, working longer increases your monthly benefit. Life expectancy is again prescribed and your life expectancy gets shorter as you age (but not by the obvious, but wrong, one year for every year lived), as well as changes as the demographics of the US change. We'll go over each factor in more detail.

Discount Rate. As we demonstrated earlier, the discount rate has a profound effect on the calculation. The discount rate used in most calculations incorporates the "Minimum Present Value Segment Rates" published by the IRS. Plans will generally specify a month that they will use for calculation for a whole year, (e.g., the October 2016 rates might be used until October of 2017). In the blended rate, the 'First Segment' is the first five years of the calculation. First Segment rates have varied widely from a low of 0.93% (April 2013) to a high of 5.44% (October 2008). The older you are, the more the First Segment matters. The Second Segment covers the next ten years of the calculation (years 5-15). Rates here have varied from a low of 3.26% (June 2016) to 5.95% (October 2008). Second Segment rates affect a larger time portion of the calculation. The Third Segment is for the years after 15 in the calculation and are longer-term rates. These have ranged from 4.16% (July 2016) to 6.10% (December 2010). Why the big deal? Let's look at estimated lump-sums on different dates. In every case, the pensioner will get a $5,000 a month pension. We're going to use a 50 year old, 55 year old, 60 year old and 65 year old. We'll use the rate in May of 2017, July of 2016, and October of 2008 (2009 lump-sum).

$5,000/month[2]	**May 2017**	**July 2016**	**October 2008**
Blended Rate	**1.96/3.77/4.62%**	**1.36/3.26/4.16%**	**5.44/5.95/5.41%**
50 year old	$1,090,976	$1,159,953	$898,645
55 year old	$1,021,760	$1,080,338	$844,206
60 year old	$939,415	$987,684	$776,946
65 year old	$842,385	$880,303	$700,839

Notice any difference? Only about $180,000 to $260,000! This is a lump-sum based on the same monthly pension, using the actual rates from the past. October 2008 was the middle of the financial crisis and the rates were sky-high. July of 2016, rates were low. If you are considering a lump-sum now or later, the question is clear: **Are rates increasing? And if so, my lump-sum is decreasing**.

Monthly pension. Our second factor is the monthly pension. Here you are either accruing a larger pension or the plan is frozen. Many defined benefit plans are frozen, meaning they have no further pension accruals, and are generally replaced by a 401(k) plan. This includes the salaried employees of the Big Three (Ford, GM and FCA). In a plan with further accrual, you gain more pension by remaining employed. In a frozen plan, the lump-sum is affected only by the discount rate and your life expectancy. So if a plan accrues 1.5% for every year of service, staying five years adds 7.5% (5 * 1.5%) to the pension, and adds any pay increases to the final compensation used to compute the pension amount. Obviously, increasing the monthly amount helps the lump-sum. Consider the effect of interest rate changes, for a 60-year old using May of 2017 rates: adding an additional year at 1.5% would increase the lump-sum from about $939,415 to $952,150[3] in one year if the rates stay

[2] Assumes today's mortality table under IRS mortality table 2016-50.

[3] Our 60 year-old got one more year of service and also got one year older, which decrease the time in the calculation.

the same[4]. A 0.5% increase in all three interest rates would decrease the lump-sum to $908,327. As you can see, the lump-sum is highly sensitive to interest rate shifts. Waiting one year increases the monthly pension, but you burned up a year of life and a ½% interest rate increase took about $31,000 off of the lump-sum.

Life expectancy. Life expectancy is like the term of the mortgage. Life expectancy is a simple test of probability using a huge set of numbers. What are the odds that 50% of all the people aged *x* today are alive? At the 50% dead and 50% alive point, that is the life expectancy. So if you are 61 today, the IRS tables appear to say you will live to age 83. But in reality, the IRS table is saying 'out of all the 61-year-olds alive today, 50% will be dead by the time they would have reached age 83.' Life expectancy ≠ Life. You may live longer or shorter, which is another set of considerations. Under Federal law, life expectancy calculations also must be unisex and racially neutral. In reality, there are different life tables for women and men. What is important here is that the lump-sum calculation is like the mortgage calculation: you are paid off at a certain point. So if the calculation shows a blended rate of 3.72% and a life expectancy of 22 years, it assumes you will burn up your lump-sum precisely in 22 years if you make 3.72%.

It needs to be noted that as long as you are alive you have a life expectancy. So a common error people make is to subtract one year from their life expectancy if they live an additional year. This is incorrect. If you survive a year, you are in the group who 'wins'. So using the IRS table, a 58-year-old has a 24.59 year life expectancy (age 82.59 years) and a 59-year-old has a 23.69 year life expectancy (82.69 years). An 83-year-old has a 6.66 year life expectancy. The longer you live, the longer you are expected to live.

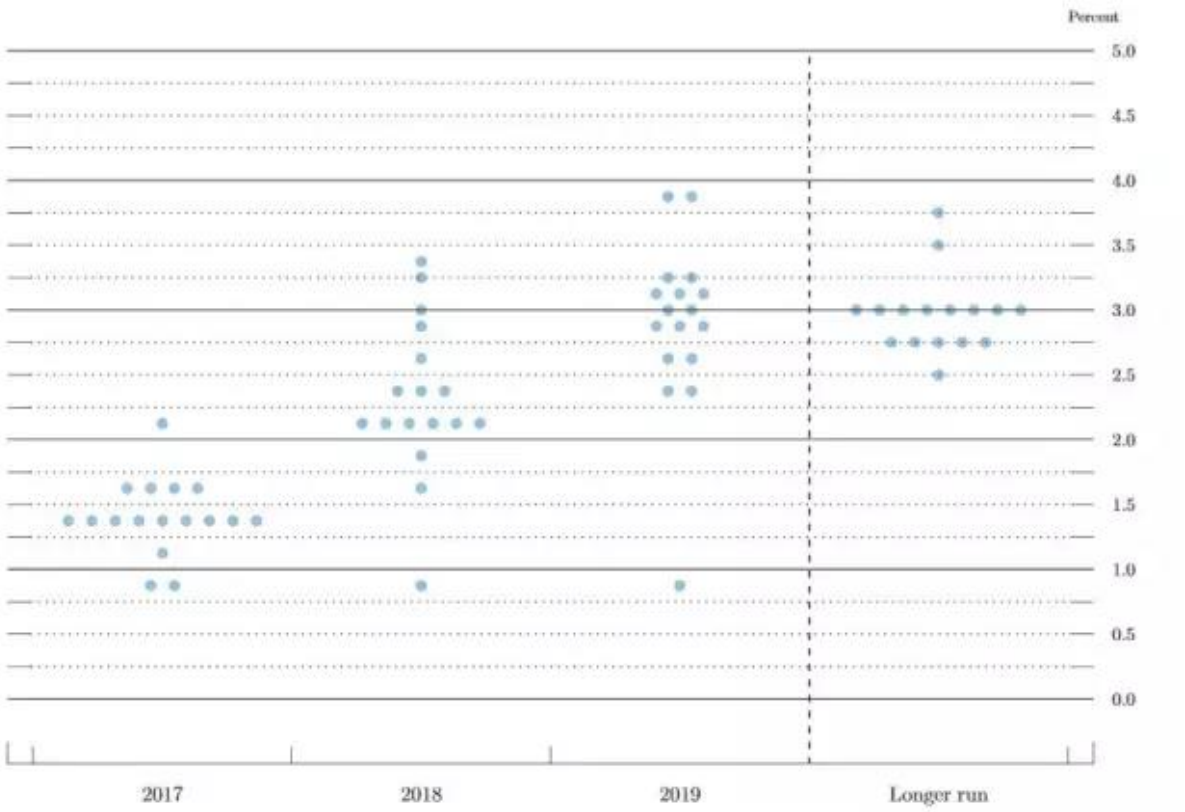
Summary so far: There are three factors in the lump-sum calculation: discount rate, monthly pension amount and life expectancy. By far, the greatest sensitivity is to the discount rate. Tiny movements in interest rates have significant effect on lump-sums.

Bonus round: Fear the Fed? So, the real question is where will interest rates go? Interest rates have been low since the end of the financial crisis of 2008. Long-term rates are the second lowest they have been since 1790, with only 1946 lightly lower. Short-term rates worldwide are at about a 5,000 year low. As of June 16, 2017, the 30-year treasury was yielding 2.78%, as compared to 7.58% in June of 1977 (40 years ago), or 15.19% in September of 1981[5]. Globally, in mid-June of 2017, German 10-year government bonds were yielding 0.28%, French bonds were yielding 0.62% and Swiss bonds yielding -0.19%. US government 10-year bonds were yielding 2.19%[6]. All of these yields are substantially lower than historical yield due to significant Central Bank activity, primarily the purchasing of bonds by the Central Banks.

At the June '17 meeting of the Federal Reserve, the Fed raised short-term rates by ¼%. Additionally, the Fed indicated that it would start selling bonds to deleverage its balance sheet. As of June '17 the Fed had $4.5 Trillion on its balance sheet. Rising rates and a tightening balance sheet typically portends a tightening monetary policy, which means higher interest rates.

[4] The retiree's monthly pension would go from $5,000 to $5,166 in this example.
[5] Source: FRED (Federal Reserve Economic Data). Federal Reserve Bank of St. Louis.
[6] Source: Bloomberg yield June 16, 2017.

Here's the Fed dot-plot[7] as of March 2017. Each dot represents the prediction of an individual Fed Governor as to future interest rates.

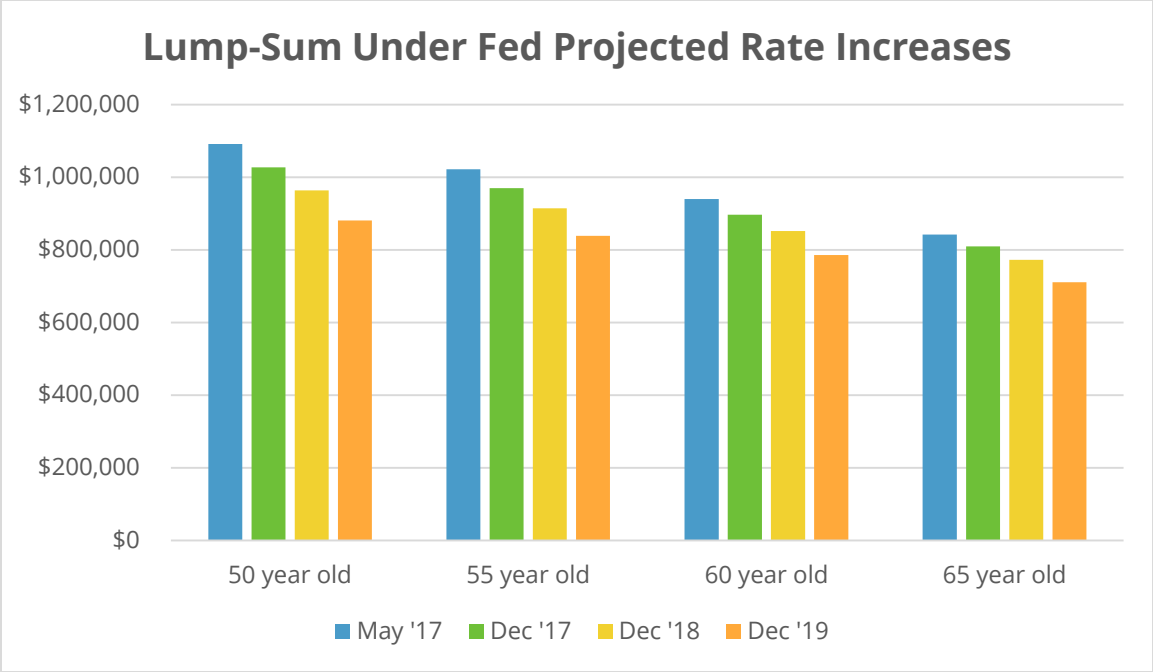


The dot plot shows the projections by the FOMC of rates, with the consensus rates low now (at 1.25 - 1.5%) and over 2 – 2.25% in 2018 and near 3% in 2019 and thereafter. The chart seems to imply more rate increases and higher rates. Here's what we estimate would happen to a lump-sum based on a $5,000 a month pension if the rates go up uniformly (all three segments increase) by 0.50% in 2017, 0.75% in 2018 and 0.75% in 2019, following the Fed dot-plot. We're assuming no future pension accrual (like Ford, GM and FCA salary pensions), but age and mortality increase:

$5,000/month[8]	**May 2017**	**2017**	**2018**	**2019**
Discount Rate	**1.96/3.77/4.62%**	**2.16/4.27/5.12%**	**2.91/4.52/5.87%**	**3.66/5.27/6.62%**
50 year old	$1,090,976	$1,027,000	$963,982	$880,944
55 year old	$1,021,760	$969,546	$914,358	$838,996
60 year old	$939,415	$897,103	$852,014	$785,667
65 year old	$842,385	$809,914	$772,140	$711,041

[7] Source: FOMC. The 'dot plot' is a graph showing each Fed member's projections for interest rates in the future. So the March 17 chart shown indicates that three member's viewed rates lower than 1.25% in 2017 -2019, but by 2019, 19 FOMC members all viewed rates above 2.25%.

[8] Assumes today's mortality table under IRS mortality table 2016-50.



Inflation. Intuitively, interest rates are tied to inflation. We have been through a period of low inflation since 1991. As inflation increases, interest rates tend to follow. With the US facing relatively full employment[9] and economic growth expanding, we have a variety of factors creating inflation. As inflation increases, the purchasing power of the monthly pension goes down. Thinking of it another way, the hurdle rate (or breakeven rate) for the 50-year old in May of 2017 is about 4.02% on a lump-sum of about $1,091,000. In 2019, if the Fed raises rates to the FOMC projected levels, the hurdle is 5.64% and the lump-sum is about $881,000. That means the retiree in May would have a $1,091,000 lump-sum that would need to make about 4.02% to replace the $5,000 a month until age 82. If the retiree makes more than 4.02%, then the money can last longer. If the retiree waits two years, they will receive $210,000 less to replace the income stream.

So this would indicate leaning toward electing to take the monthly pension if rates increase. Sounds logical, but it is somewhat counterintuitive. If rates rise, it will be easier to find fixed income alternatives to help beat the hurdle rate. In other words, if rates rise, it might be better to take the larger lump-sum now, invest wisely, and adjust to the higher bond rates in the future.

It is an oversimplification to suggest the Fed is the only factor controlling interest rates, and it is also highly unlikely that the three segments of rates move collectively. Inflation here and abroad, the Dollar exchange rate, geopolitics and the economy all play a role. Look at any interest rate chart over a long period and you will see a succession of movements and changes. One thing you will clearly see, however, is that rates now are low on a historic basis.

[9] Full employment is compounded by reductions in labor force, e.g. decrease immigration.

Conclusion: Let's get back to the simple example of a mortgage, since the math is quite similar. When can you get the biggest mortgage based on fixed monthly payments? When interest rates are low. If you thought interest rates were rising, would you take the mortgage out now or wait until the rates went up? If a person is pension eligible, and they have the opportunity to take a lump-sum and are considering it, then the prospect of rising interest rates would weigh into their decision.

Want some help? If you want help looking at a lump-sum decision, or if you are considering a buyout, we are able to provide a review, including using our modeling estimator. We also have a series of other materials, including papers on buyouts and lump-sums. If you want to talk to one of our advisors, please contact us (info@ljpr.com or 248-641-7400). We can have a live or virtual meeting. We offer a one-hour complementary consultation. We'd need some information before our conference to give you the best possible advice.

LJPR Financial Advisors
5480 Corporate Drive, Suite 100
Troy, MI 48098
248.641.7400
http://ljpr.com
info@ljpr.com

Reducing Uncertainty™