



How IMRF Calculates Your Employer Contribution Rate

The employer contribution to IMRF is a significant expenditure for units of government. This article will explain the calculation of your rate and the purposes for which the contributions are used.

Structure of IMRF

IMRF is a multi-employer agent public employee retirement system. This means we have more than one employer (2,963), and each employer funds its own employees' retirement benefits. In addition to retirement benefits, IMRF also provides death and disability benefits.

The revenue that is used to pay retirement benefits comes from three sources:

- Investment income
- Member contributions
- Employer contributions

IMRF retirement benefits are paid under a defined benefit plan with fixed member contributions. That is to say, both member contributions and the benefits to be paid are established by state law. The difference between the cost of legislated retirement benefits and member contributions must be paid from either investment earnings or from employer contributions. Each year, an independent actuary calculates an employer contribution rate for each employer; the calculation assumes IMRF will earn 7.5% on its investments. This rate, expressed as a percent of participating payroll, determines the employer's contribution.

How pension costs are calculated

To fund a future pension, you must be able to estimate the cost of that pension. This is where the independent actuary comes in. To determine the cost of the pension, the actuary needs four types of information:

- Member demographic information
- Actuarial assumptions
- Employer information
- A method for distributing the costs

This data is combined mathematically to determine how much each employer must contribute each year. We will describe below the significance of each item and how it impacts the rate you pay.

Member demographic information

IMRF pensions are determined by a formula which multiplies a member's final rate of earnings by a percentage. This percentage increases each year, depending on which plan (regular, SLEP, or ECO) is involved. Therefore, salary history and service accrued are required information.



While benefit amounts are not determined by gender, gender does affect longevity which determines how much money will be needed to pay a member's pension. Therefore, gender is another important piece of information. Age is a factor as well, because it determines how much time is left before a pension will be paid. Gender and age also affect the probability of mortality, disability, separation, and marital status.

Actuarial assumptions

Because we are trying to determine the cost of future events, we need to estimate the probability of those events occurring. Actuarial assumptions are a formal set of estimates of what will happen to IMRF members. We could set rates on the assumption that all members will retire at 65 with a spouse two years younger, and that they will live for 25 years thereafter. These assumptions would be incorrect and would result in IMRF being overfunded. For example, not every member retires, some die, and some members take refunds. Some members are not married upon retirement. Some live to be 100, and some die at 67. To ensure that the assumptions we use are as accurate as possible, every three years the actuary compares the actual experience of the Fund to our assumptions. The actuary then recommends any necessary changes in the assumptions to the IMRF Board of Trustees.

The actuary uses eight principal assumptions to determine rates.

Investment return: Pension plans are established on the premise that investment earnings will pay part of future benefits. The investment return assumption is the estimate of what the investments will earn on average at a compound rate over the long term. The current assumption for IMRF is 7.50%. It is expected that in some years the investment return will be higher than 7.50% and in some years the investment return will be lower than 7.50%.

Retirement age: As you might expect, this is an estimate of how many members will retire at a given age. The rates vary by age and by gender. Beginning in 2011, retirement age estimates will be impacted by whether a member is in Tier 1 or Tier 2.¹

Marital status: This is an estimate of how many members will have a spouse eligible for a survivor's pension. These rates vary by age and by gender.

Mortality for active members: This is an estimate of how many active (non-retired) members will die in a given year. These rates vary by age and by gender.

Mortality of retired members: This is an estimate of how many retirees will die in a given year. These rates vary by age and by gender.

Disability: This is an estimate of how many active members will become disabled in a given year. Although disabled members receive service credit toward a pension while on IMRF disability, neither the employer nor the member makes contributions toward the member's retirement during the disability period. These rates vary by age, gender and service.

¹ Public Acts 96-0889 and 96-1495 made a number of changes, one of which was to increase the normal retirement age.



Separation: How many active members will leave employment in a given year? Contributions need not be made for members who terminate and take a refund. These rates vary by age, gender and service.

Payroll increases: Pensions are based on a member's salary at the end of his or her career for the regular and SLEP plans. Therefore, when the actuary calculates the benefits to be paid at retirement, future salary increases must be considered. IMRF currently estimates salary increases of between 7% and .4% per year due to merit and 4.00% due to inflation, for the Regular Plan.

A summary of the actuarial assumptions used can be found in the IMRF annual financial report which is available online at www.imrf.org.

Employer information

There are two important pieces of information that the actuary must know about each employer: the employer's asset balance and the amortization period for the unfunded liability. Both items have a significant effect on the rate.

Employer Assets

Each employer has an asset account with IMRF. This account is used to pay retirement benefits for the employer's own employees. The items which increase or decrease this account are:

- Employer retirement contributions (employer contributions minus death, disability, Early Retirement Incentive (ERI), and supplemental [13th payment] contributions)
- Interest credited or charged on the opening balance at the prescribed rate
- Adjustments, if any
- Residual investment income or loss (Each year after interest is distributed to member, annuitant, and employer reserve accounts; any remaining investment income or loss is distributed among all employers. An employer's share of the distribution is based on its assets and the present value of annuities for the employer's retired employees)
- The employer's share of the cost of an annuitant's pension. (Upon retirement we calculate the present value of the annuitant's pension. From that amount we subtract the annuitant's own contributions and the interest earned on those contributions. The remaining difference is then subtracted from the employer's account and added to the annuitant account. This is a one-time charge to the employer's account when the employee retires.) An employer may make payments to reduce the unfunded liability (increase employer assets). Since IMRF calculates interest on the beginning of the year balance only, we recommend remitting any such payment in December.

Amortization Period

Generally, each IMRF employer has an unfunded liability due to prior service of employees when the employer joined IMRF. The unfunded liability is the estimated cost of retirement benefits earned to date that have not been funded. That is to say, the employer does not have enough assets with IMRF to pay those benefits. A portion of



the unfunded liability must be paid each year; the portion is determined by the employer's structure. For most employers, the unfunded liability is amortized over a 30-year open period. Participating instrumentalities (employers without taxing authority) the unfunded liability is amortized over a 10-year open period.

Methodology for distributing costs

After the actuary estimates the cost of future benefits, a method is developed for determining how much of the future cost will be paid each year. The possibilities are infinite. One possibility could be to contribute the whole amount when a member joins. Another possibility could be to contribute whatever is needed in the five years between ages 50 and 55. The actuarial profession has developed several widely accepted methodologies. IMRF uses the following method:

Entry age normal is the method IMRF uses to calculate employer retirement rates. This method is also used by IMRF employers to report pension liabilities in their financial statements in accordance with Governmental Accounting Standard Board Statement Number 50 (GASB 50).

Under this method, the cost of each individual's pension is allocated on a level percent of payroll between the time employment starts (entry age) and the assumed retirement date. The cost includes expected future service and salary increases. The goal is to spread the cost over the career of the member as a level percentage of payroll.

For example, assume a member begins participation in IMRF at age 25 and the average retirement age is 62. This means there are 37 years between entry age (25) and retirement (62) in which to contribute toward the pension. The cost of the future pension is distributed over the 37 years. Each year the employer pays a percentage of the employee's salary. If everything works as planned, when the employee retires the contributions (member and employer) and the interest on those contributions is sufficient to pay the pension and survivor's benefits.

Calculating the present value of benefits

Combining all the factors described above into an employer rate is a two-step process. First, the actuary calculates the present value of benefits for each member using the demographic data and the actuarial assumptions at the date of the valuation.

The calculation is extremely complex but a simple example may help to demonstrate the process. Let's assume we have a female active member, who is 40 years old, has five years of service and a current salary of \$30,000. All the steps required to calculate the present value of benefits for an active member will not be shown in the interests of brevity.

First we will calculate the pension she has earned to date. Members in the Regular IMRF plan earn 1.667% of their final rate of earnings for every year of service through the first 15 years and 2% for each year after that. Our sample member has earned a pension equal to 8.34% (1.667% times 5 years) of her final rate of earnings.



In real life, the actuary would also estimate her final rate of earnings assuming merit and inflation increases up to her expected retirement date. For our example we will use her current salary.

Current salary	\$30,000.00
Multiplied by pension credits earned	<u>.0834</u>
Estimated annual pension earned to date	<u>\$ 2,502.00</u>

The next step is to calculate the present value of benefits at retirement. Her annuity pension will be paid for her lifetime and increased by 3%¹ of the original amount each year. Upon her death the survivor's benefit will be paid to her spouse for his lifetime. However, because the annuity will be paid monthly over many years, we do not need all the money available at retirement. So we calculate the present value of the life annuities for our member and her spouse. This calculation includes three estimates: the member's life expectancy, the spouse's life expectancy and the estimated long-term investment earnings rate.

Estimated annual pension earned to date	\$ 2,502.00
Multiplied by the present value factor for a joint and survivor life annuity with a 3% annual increase payable monthly at a 7.50% discount rate using the 1994 Group Annuity Mortality Table	<u>14.8125</u>
Estimated present value of benefits at retirement	<u>\$37,060.88</u>

But our member is not ready to retire yet. Let us assume that she will retire at 60.² This means that we have 20 more years to invest the money at 7.50% before she is ready to retire. So we need to calculate the present value of her retirement benefits as of today.

Estimated present value of benefits at retirement	\$37,060.88
Multiplied by the present value factor for 20 years assuming an investment return of 7.50%	<u>.2354</u>
Estimated present value of benefits at age 40	<u>\$8,724.13</u>

¹ Public Act 96-0889 limits post retirement for Tier 2 members to 3% of the original amount or 1/2 of the increase in the Consumer Price Index, whichever is lower.

² Public Act 96-0889 sets the normal retirement age at 67 years for Tier 2 members.



The estimated present value of benefits at age 40 is the amount of money that must be set aside now and invested at a 7.50% compound rate in order to pay this member's pension. However, we have no guarantee that she will stay another three years until she is vested. To be more accurate, we must adjust the present value for the likelihood that she will stay for three more years and vest. To do this, the actuary multiplies the estimated present value by the probability of vesting. This probability is .920, that is to say, out of a group of 1,000 females 40 years of age with five years of service, 920 will stay another three years.

Estimated present value of benefits at age 40	\$8,724.13
Estimated probability of vesting	<u>.920</u>
Adjusted present value of benefits	<u>\$8,026.20</u>

In this simplified example, we only adjusted for the probability of termination. In real rate calculations, we would also adjust for the probabilities of future service, death, disability, marital status and future salary increases. As you might expect, the present value of benefits is complex.

To review the process described so far: the actuary calculates the cost of each member's expected future benefit, adjusts that cost for the probability that the benefit will not be received, and then determines how much of that cost must be paid each year. This cost then is translated into a rate.

The five parts of the IMRF employer rate

The employer IMRF rate is made up of five parts:

- Death benefit contributions
- Disability benefit contributions
- Supplemental retirement contributions
- Normal retirement contributions
- Amortization of the unfunded liability contributions

Each is calculated separately and used for specific purposes designated by state law. Some employers may have an early retirement incentive (ERI) rate included in their employer rate.

Death benefit contribution rate

The death benefit contributions are used to fund the death benefit paid to beneficiaries of IMRF members who die in service. If a participating member with more than one year of service dies, his or her beneficiaries are entitled to lump sum payments equal to one year's salary. This benefit is paid solely from the employer death benefit contributions. IMRF member contributions are not used to fund IMRF death benefits.



The contributions from all employers are pooled to pay this benefit, much like life insurance. The rates are calculated separately for each employer based on the average age of their employees. Employers with older employees pay a higher rate. Employers with younger employees pay a lower rate. The average death benefit contribution rate for 2012 is .20% of participating payroll for the Regular, SLEP and ECO plans.

Disability benefit contributions

The disability benefit contributions are used to pay IMRF disability benefits. Members with more than one year of service are eligible for disability benefits up to 50% of their salary if they are disabled for more than 30 days. Only employer contributions are used to pay these benefits. No member contributions are used.

Like death benefit contributions, disability benefit contributions are pooled. Unlike death benefit contributions however, all employers pay the same rate. The disability benefit contribution rate for 2012 is 0.13% of participating payroll.

Supplemental retirement contributions

The supplemental retirement contributions are used to pay the additional “13th payment” paid in July of every year. Retirees and surviving spouses who have been receiving benefits for at least one year receive a supplemental benefit payment in July of each year. The supplemental retirement rate is set by state statute and is 0.62% of participating payroll.

Normal retirement contributions

Both normal retirement contributions and the amortization of the unfunded liability pay the employer’s portion of retirement benefits. However, they are calculated separately.

The normal retirement contribution, also referred to as the normal cost, is the percent of payroll necessary to fund this year’s portion of the expected total cost of future benefits for the average IMRF member. Remember, earlier we said that under the entry age normal method, the actuary distributes the expected future cost over the member’s career as a level percent of payroll. That level percent of payroll is the normal cost. What makes it tricky for IMRF is that the normal cost is not calculated separately for each employer. Except for several larger employers who have opted to have their normal cost calculated on an individual basis, the normal cost is calculated for the Fund as a whole. Thus, most IMRF employers have the same normal cost.

For 2012 the normal cost is 7.58% for regular employers, 12.01% for SLEP employers, and 17.22% for ECO employers. (Eligible employers who opted to have individual rating of normal cost paid the incremental actuarial fees required of the calculation.)

Now, if every employer had identical groups of members, benefits never changed and assumptions never changed, we could stop the process here. Since that is far from being the situation, we must also include a factor to make up the difference. That is the prior service cost or the amortization of unfunded liability.



Unfunded liability contributions

The unfunded liability is calculated for each employer as follows:

Present value of benefits for all employees

Less:

Member assets

Future member contributions

Employer assets

Future employer normal cost contributions

As we have discussed before, the actuary calculates the present value of the expected retirement benefit for each IMRF member. The sum of the expected benefits for all of an employer's members is the present value of benefits for that employer.

Please keep in mind that the present value assumes that some employees will retire, some employees will take refunds and some employees will die.

Therefore, we subtract the members' contributions and interest, both past and estimated future. The employer retirement contributions are needed only for those employees that retire. The employer has usually already made some contributions and the employer's asset account has earned investment income so we need to subtract those amounts. The employer's future normal cost contributions will pay the cost of future service, so we want to subtract that as well. The remainder is the employer's unfunded liability.

You may ask—why do I have an unfunded liability? If the actuary has made all these complex calculations which are supposed to accurately predict the future, why is the unfunded so high? The reasons are many and differ from employer to employer. Some of the most common are explained below.

Prior Service is a common reason for employers who have joined IMRF in the last 40 years. Prior service is service credit granted to employees for employment prior to the date the employer joined IMRF. An example may clarify it. Assume an employer joins IMRF in 1990. When it joined it had employees already working. These employees were given pension credits (at no additional cost to them) for the period of employment prior to 1990. The employer did not make any additional contributions at that time for this service. The cost was added to the unfunded liability.

Benefit Improvements granted after a member joins IMRF increase the unfunded liability. Remember when we discussed entry age normal, we said that the actuary calculates the expected cost of a member's benefit and spreads it evenly over the expected career of the member. Well, if benefits change during the member's career, the actuary's original calculation will be inaccurate. The actuary can adjust the normal cost for future years to reflect the new benefits. The additional cost for years for which service was already granted is added to the unfunded liability.

Past Service Adjustments are another item that increases the unfunded liability for an employer. The pension code defines circumstances under which a member may establish retroactive or omitted service credit by paying



the member contributions plus interest. When the service is established, the employer is not asked to make any contributions. The employer's cost for this service is added to the unfunded liability.

Changes in Actuarial Assumptions can cause the unfunded liability to increase or decrease depending on how the assumptions change. As mentioned before, every three years the actuary compares the estimates we use to project future costs to our actual experience. We change our assumptions to match our experience. These changes can result in additional costs that have not yet been funded, thus adding to the unfunded liability.

The Employer's Demographics compared to the demographics of the Fund as a whole can have a significant effect on its unfunded liability. We calculate the normal cost on IMRF as a whole. To the extent that an employer's employees differ from the average IMRF member, that employer's unfunded liability will vary to make up the difference. As mentioned earlier, the actuary assumes payroll increases will be 4% a year plus merit increases. To the extent that individual employers grant payroll increases more or less than the actuarial assumption, the unfunded liability will be impacted.

Investment Earnings less than or greater than 7.50% will have an affect on the unfunded liability. Obviously, if returns are greater than 7.50% the unfunded will decrease. If returns are less than 7.50%, the unfunded will increase.

Based on the employer's structure, the amortization period determines how much must be paid in a given year. This factor is determined by the actuary based on the previous year's contributions, interest rate assumption, payroll growth, and amortization period and may vary from employer to employer. Because the actuary assumes that payrolls will increase for inflation each year, the factor is not 1/30th as you might expect. The amount to be paid is divided by the expected payroll of the employer to determine the unfunded amortization rate. An unfunded amortization rate is separately calculated for each employer based on its payroll and unfunded obligation. For this reason it is difficult to compare rates among employers.



The following basic example shows how the unfunded rate is calculated for an employer.

Present value of benefits	\$343,975
Less: Member assets	\$60,346
Future member contributions	\$46,369
Employer assets	\$36,090
Future normal contributions	<u>\$71,511</u>
Unfunded obligation liability	\$129,659
Multiplied by the 30-year amortization factor	<u>.05361</u>
Required annual contribution	6,951
Divide by estimated annual payroll	\$93,996
Unfunded amortization	7.39%
Total Rate	
Normal cost	7.58%
Unfunded amortization	7.39%
Death benefit rate	.20%
Disability rate	.13%
Supplemental rate	.62%
Total Rate	<u>15.92%</u>

As you can see, the unfunded amortization rate depends not only on the size of the unfunded liability but also on the size of the payroll. An employer's unfunded amortization rate may increase not because the unfunded liability increased, but because the payroll decreased sharply. This situation often arises for small employers when a long-term employee leaves and is replaced by someone with a much lower salary. Unless the long-term employee takes a refund, the present value of benefits does not decrease. However, because the estimated payroll has decreased markedly, the unfunded rate goes up. The reverse can happen if an employer increases its payroll dramatically.



Overfunded Employers

Amortization for employers who are 120% or more overfunded on a market basis is handled differently. Overfunding occurs when the total assets exceed the actuarial obligation. The funding ratio of an employer can be found on the GASB Statement Number 50 disclosure furnished annually by IMRF.

The primary goal of IMRF is to produce stable employer rates. However an employer who is 120% or more overfunded on a market basis will be given the option of selecting a minimum contribution amount as long as the employer remains over 120% funded on a market basis. Selecting the minimum contribution option will increase rate volatility. Some employers with limited ability to increase tax levies may want to continue with the normal amortization period since it provides more stable rates. Once overfunded amounts are used up, employer rates will increase to the normal cost rate, death, disability, and supplemental rate plus amortization of any unfunded amounts. Employers who are over 120% funded on a market basis may use the overfunding to reduce or satisfy an early retirement incentive liability.

Summary

Your IMRF contribution rate is determined by the following factors:

- Member demographics and IMRF benefits
- Actuarial assumptions
- Employer information and investment earnings
- Method for distributing the costs

This article has briefly explained how each of these items work together to affect the rate you pay. IMRF benefits are an important employee benefit for your employees; therefore both you and your employees should understand how these benefits are funded. We hope this explanation has helped with that goal.

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