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Salary Increases on Both Sides of the Equation: Higher Benefits and More Funding

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Many employers have seen higher than normal payroll increases over the past few years following higher post-pandemic inflation rates and labor shortages. While these larger salaries are increasing liabilities for pay-based benefits such as pensions, these pay increases also provide for more contributions into the plan from both employees and employers since pension plans are generally funded as a percentage of payroll.

What factors influence the interplay between larger projected benefits versus more funding due to excess salary increases? Items to consider include:

- Ratio of actives to retirees in the plan membership,
- Funded status of the plan,
- Amortization methodology,
- Actuarially determined versus fixed rate funding

What happens when there are additional future economic or demographic challenges such as:

- Asset shocks such as large investment losses like those that occurred during the Great Recession,
- Declining active headcounts due to fewer school children from lower birth rates and/or an uptick in homeschooling and private school vouchers.

As this paper illustrates, the main driver of the interplay between increased benefits and increased funding due to higher salaries is how well funded the plan is at the time of the one-time bump in salary. The increase to the active benefits is immediate and is an immediate increase to the unfunded actuarial accrued liability (UAAL). This increase will have to be paid for over time with additional contributions. The smaller the initial UAAL, the fewer contributions needed to pay it off in the first place. Any increase to the UAAL puts a strain on the contribution stream and requires excess payments. However, plans with higher initial UAALs can absorb the increase more easily. A similar impact occurs when the higher salaries are coupled with other economic or decremental shocks such as a declining active headcount or a one-time large asset loss. We will demonstrate these results through the remainder of the paper.

Basic Retirement Formula

The basic retirement formula is **C + I = B + E**.
In this formula:

- Contributions **(C)** plus Investment Income **(I)** paid into the plan must equal
- Benefits **(B)** plus Expenses **(E)** paid out of the plan.

In other words, ***money in = money out***.

Actuarial Assumptions

In an actuarial valuation, we apply the actuarial assumptions to project benefits **B** for the lifetime of every member in the plan on the snapshot valuation date. Using the investment rate of return assumption to calculate investment earnings **I** and applying the funding policy, the actuary calculates the contributions **C** to be used to systematically fund the plan. Most pension plans either pay the contributions **C** determined by the actuary (the Actuarially Determined Employer Contribution or ADEC) or the plan pays a fixed rate which is compared to the ADEC to assess the health of the plan.

The long-term liability of a pension plan is calculated by estimating the present value of the projected benefits for all members in the plan on the valuation date, including active employees, former employees who are eligible to begin receiving retirement benefits at a later date, and current retirees who have already begun receiving their monthly pension. For the former employees and current retirees, the amount of the monthly pension benefit is known. The only uncertainties at this point are life expectancy (the number of monthly benefits that are yet to be paid to the retiree and the beneficiary, if applicable), and any cost-of-living increases (COLAs), if the amount of the COLA is not pre-determined.

For active employees, however, a multitude of assumptions must be made in order to project the benefits expected to be paid out. These assumptions include not only life expectancy, but employee behavior. Will the active employee terminate employment before working long enough to be eligible for a pension benefit? In this case, the members would only be eligible to receive a refund of their own contributions into the plan. But, if the active employee works long enough to be eligible for a pension benefit, assumptions must be made about the age of benefit commencement, the amount of the benefit and the duration of the benefit.

Salary Based Pension Benefits

An important assumption that must be made to project benefits for employees who are still working is salaries. Most public sector pension plans pay lifetime benefits with the benefit amount being based on a multiplier times final average pay at retirement times years of service. Therefore, assumptions are made regarding not only age and service at retirement but also the final average salary upon which the benefit is based. Higher salaries mean higher benefits. Everything else being equal (such as the date a member chooses to retire and the service component of the benefit), a one-time unexpected bump in salary will directly increase the projected benefit payable at retirement, and therefore the liability.

Assuming the one-time bump in salary doesn't alter other assumptions, it will increase projected benefits for active members by roughly the amount of the additional increase. Most pension plans use 3-5 year final average salary determinations, so only those active employees who are within 3-5 years from retirement will see less than the full impact. Since excess salary increases do not

increase benefits for current retirees (except in limited instances such as salary replacement long term disability plans), the liability impact to a retirement system depends on the ratio of active employees to retirees. Although excess salary increases in some cases can be considered related to economic conditions, such as the inflation environment (which in turn impacts assumed investment rates of return and COLAs), for this exercise we are considering the salary bump to be related to labor issues and not economic considerations. Therefore, all economic assumptions remain the same (including regular future salary increases) and the only change is the one-time excess salary bump. We are also not explicitly considering career average or cash balance plans where the salary impact is mitigated because it is spread out over a large number of years, or possibly the entire career.

In the sections that follow, we will analyze the ADEC under:

- one-time salary bumps (where the entire set of pay bands for current and future employees are adjusted upward and then go back to normal increases),
- situations of declining active membership,
- one-time large asset loss shocks, and
- combinations of these scenarios.

In all cases, the contributions will need to be higher as a dollar amount in order to cover the cost of the increased benefits. However, for plans that pay the ADEC, we are interested in the ADEC ***as a percentage of payroll***, since that is typically how the costs are communicated to stakeholders and requested as a budget item. We will also look at the impact of salary bumps on fixed rate plans, since those plans (by definition) fund as a fixed percentage of payroll and are directly impacted by salary changes.

ACTUARIALLY FUNDED PLANS

Impact of a One-Time 10% Salary Bump

The following scenarios demonstrate the impacts of:

- a one-time 10% salary bump,
- a 2% annual decline in active membership, and
- the combination of the two

on actuarially funded plans that pay the calculated ADEC each year.

Excess Pay Increase Scenarios - 10% One-Time Salary Bump

Consider a scenario where all active employees receive an excess pay increase of 10% more than would be expected based on the actuarial assumptions. If a member would normally be expected to receive a 3.50% pay increase, the same member would receive a one-time 13.50% pay increase in the year in question. Then the member will go back to expected salary increases of 3.50% or so until retirement. This will increase the member's projected pension benefit by approximately 10.00% over what would have been otherwise assumed under the actuarial assumptions. This will in turn increase active liability by approximately 10.00%, while leaving the inactive and retired liability unchanged. In a situation where active liability is approximately 40% of the total liability, the overall increase in accrued liability would be about 4.00%.

In this study, the one-time 10% pay bump also applies to future hires as a one-time increase to base starting salary. Therefore, the liability increase down the road will be approximately 10% as current retirees die and the entire covered population is made up of members subject to the one-time 10% pay increase. This scenario could be considered a 10% salary adjustment where the entire pay scale grid is increased by 10% while the rest of the actuarial assumptions remain unchanged.

These liability increases will be mitigated by higher employee and employer contributions. Depending on several factors such as the ratio of active to retired liability, the amortization period and the funded ratio of the plan, the Actuarially Determined Employer Contribution (ADEC) rate as a percentage of payroll could actually decrease with the higher than expected payroll amounts.

TABLE 1 For illustration and comparison, we will set the actuarial value of assets (AVA) to the market value of assets (so no actuarial smoothing of prior asset gains or losses) and introduce no contribution lag. All analysis considers three sample systems for teachers and school employees with the following characteristics:

	Fund A	Fund B	Fund C
% Liability Due to Actives	**41%**	**37%**	**43%**
% Female	**70%**	**75%**	**74%**

For all scenarios, the charts will show projections of the Actuarial Accrued Liability (AAL), the Actuarial Value of Assets (AVA) and Actuarially Determined Employer Contribution (ADEC), both baseline and after a 10% salary bump, for the 3 sample plans assuming:

- Level active headcounts
- 20-year closed amortization period with a single base
- Amortization using a level percentage of payroll with flat active headcounts. (For the declining active population scenarios, the amortization will be level dollar and the active headcounts will be declining.)
- Full ADEC is contributed each year
- All other actuarial assumptions are met

Under all scenarios, the beginning AVA will equal the Market Value of Assets (MVA) and will be set to force the plan to be the applicable funded ratio in the initial year. In all cases, both the accrued liabilities and the dollar amounts of the ADEC (and the employee contributions) will be higher under the 10% salary bump scenario than under the baseline scenario. This will in turn lead to higher assets since the plans will all become 100% funded after the 20-year amortization period has elapsed either way. However, we are interested in what happens to the ADEC as a ***percentage of payroll***. This statistic is crucial since requests for employer contributions to fund the pension plan are usually framed as a percentage of active member payroll. We analyze this under different scenarios as follows.

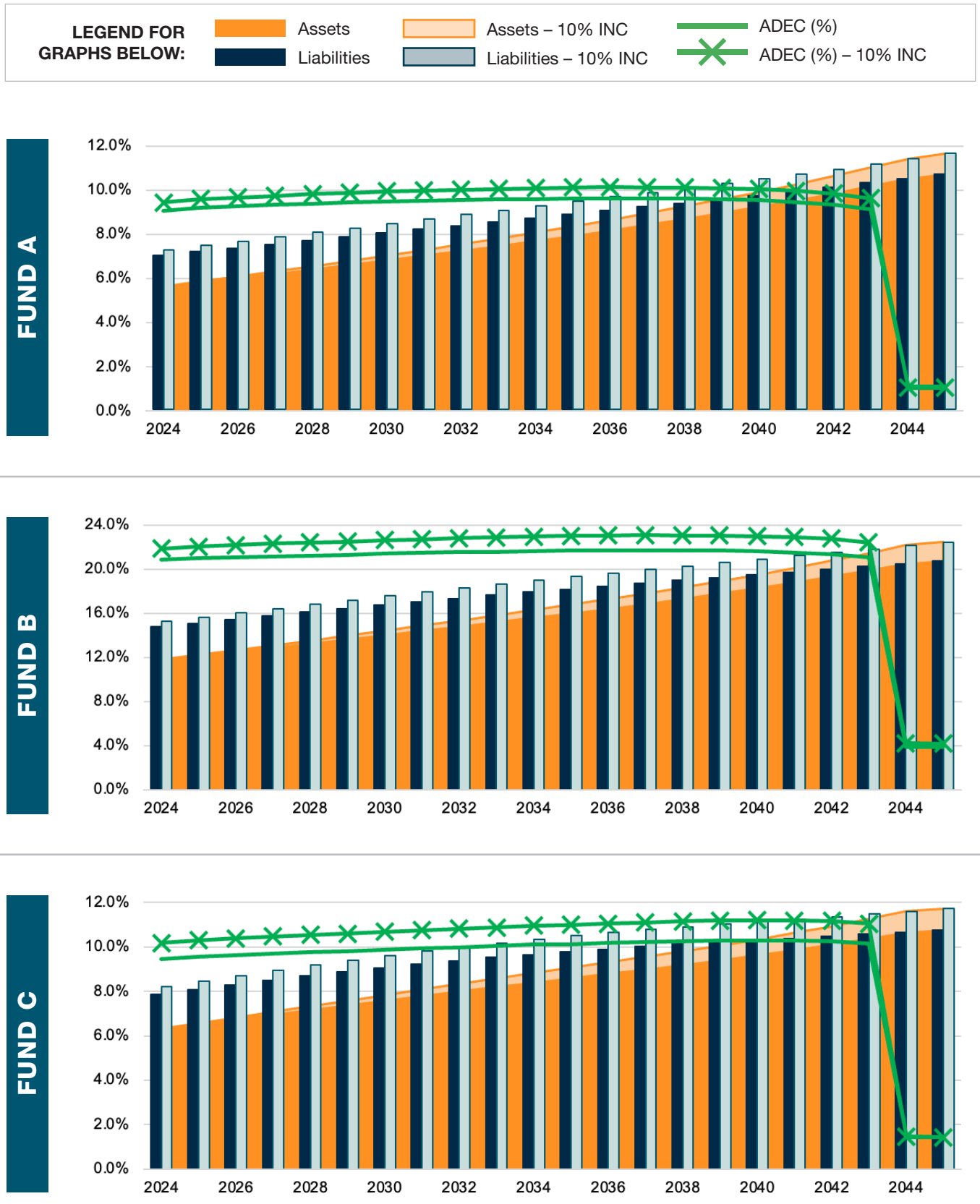
Scenarios Assuming Initial 80% Funded Ratio

Under this scenario, the AVA is set to force the plan to be exactly 80% funded in the initial year. In **FIGURE 1** on the following page, the blue bars represent the accrued liability. The dark blue baseline bars will always be smaller than the light blue bars showing the accrued liability after the 10% salary bump. The orange area chart shows the assets before and after the 10% salary bump. The light orange after-bump section is higher because of the increased employer and employee contributions coming into the plan. This is necessary to pay off the now larger unfunded actuarial accrued liability over the same 20 years as under the baseline.

We are interested in what happens to the ADEC ***as a percentage of payroll*** after the 10% excess salary increase compared to the baseline. As you can see from **FIGURE 1** on the following page, the ADEC as a ***percentage of payroll*** is ***higher*** after the one-time 10% salary bump for all three sample plans. Please note that the ADECs drop dramatically after 20 years because this is the point where the plan will be 100% funded under our modeling parameters and will only require Normal Cost contributions to pay for the continuing accruals of the active membership.

FIGURE 1 - RESULTS BASED ON 80% FUNDED RATIO

ADEC AS PERCENTAGE OF PAYROLL HIGHER FOR ALL FUNDS AFTER SALARY BUMP



Scenarios Assuming Initial 60% Funded Ratio

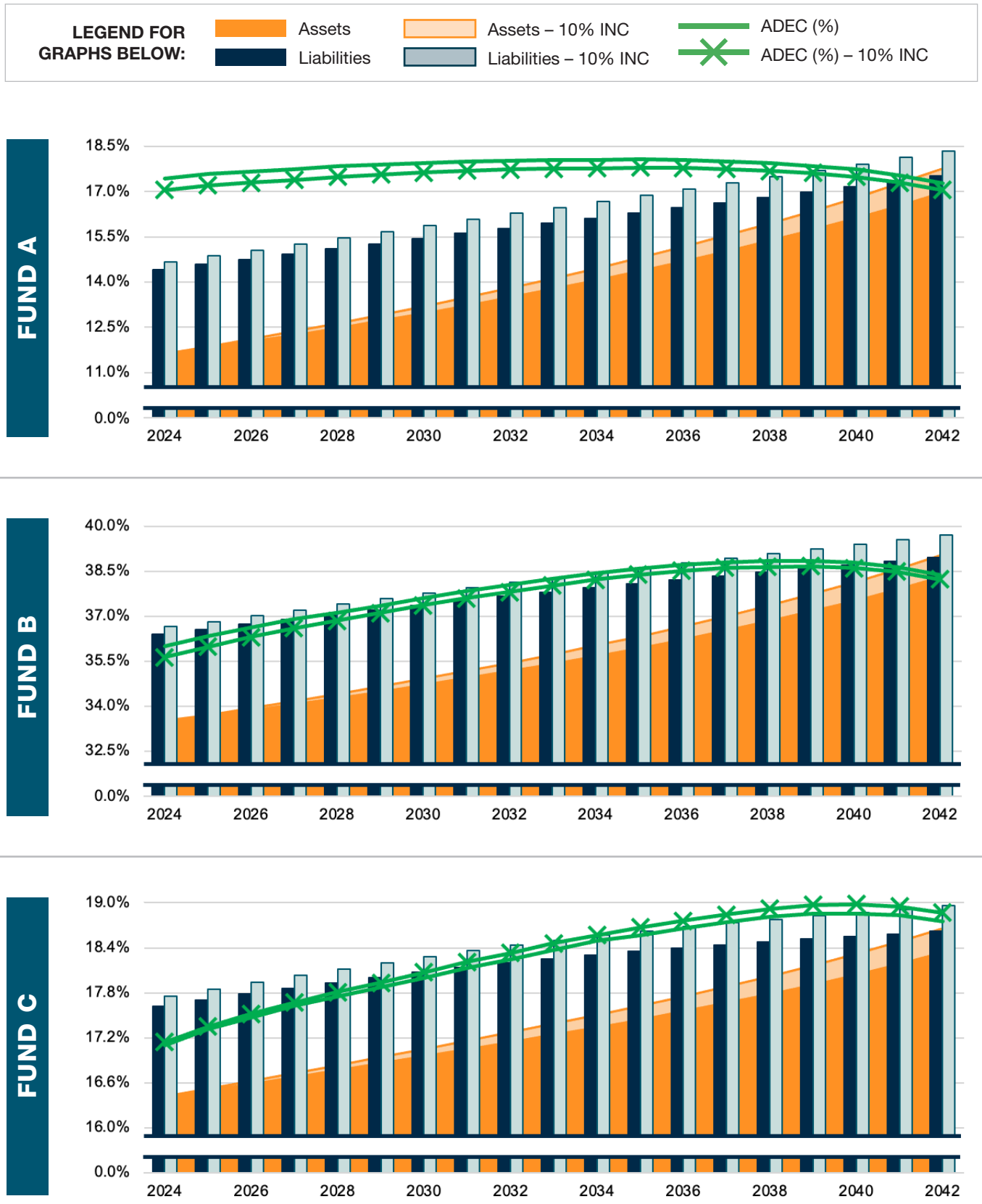
Under this scenario, the AVA is set to force the plan to be exactly 60% funded in the initial year. As you can see from **FIGURE 2** on the following page, the ADEC as a ***percentage of payroll*** is ***lower*** after the one-time 10% salary bump for two of the three sample plans, and still ***slightly higher*** for the third sample plan. This scenario highlights the relevance of having active member salaries on both sides of the C+I = B+E funding equation. The 10% salary bump increases the projected benefit stream B, but also increases the contribution stream C. The employee contribution percentage is fixed while the employer contribution percentage varies based on what is needed to actuarially fund the plan.

Please note that starting with **FIGURE 2**, the scale of the charts are changed to better exhibit the variances between the ADEC as a percentage of payroll before and after the 10% salary bump is applied. Unless otherwise noted, all scenarios will reach 100% funded in 20 years, at which time assets will equal accrued liability and the ADEC will drop to Normal Cost only.

We note that the ADEC percentage is higher even under the baseline scenario shown in **FIGURE 2** than in the 80% funded scenarios shown in **FIGURE 1**. That is to be expected because more ground needs to be made up to get from 60% to 100% funded in 20 years than from 80% to 100%. Also, in all scenarios, the dollar amount of the ADEC is higher after the 10% salary bump. However, the higher payroll means more dollars for a given percentage of payroll. So, when the plan is only 60% funded, the ADEC as a percent of payroll drops or is about the same even as the dollar amount has increased.

FIGURE 2 - RESULTS BASED ON 60% FUNDED RATIO

ADEC AS PERCENTAGE OF PAYROLL LOWER OR ABOUT THE SAME FOR ALL FUNDS



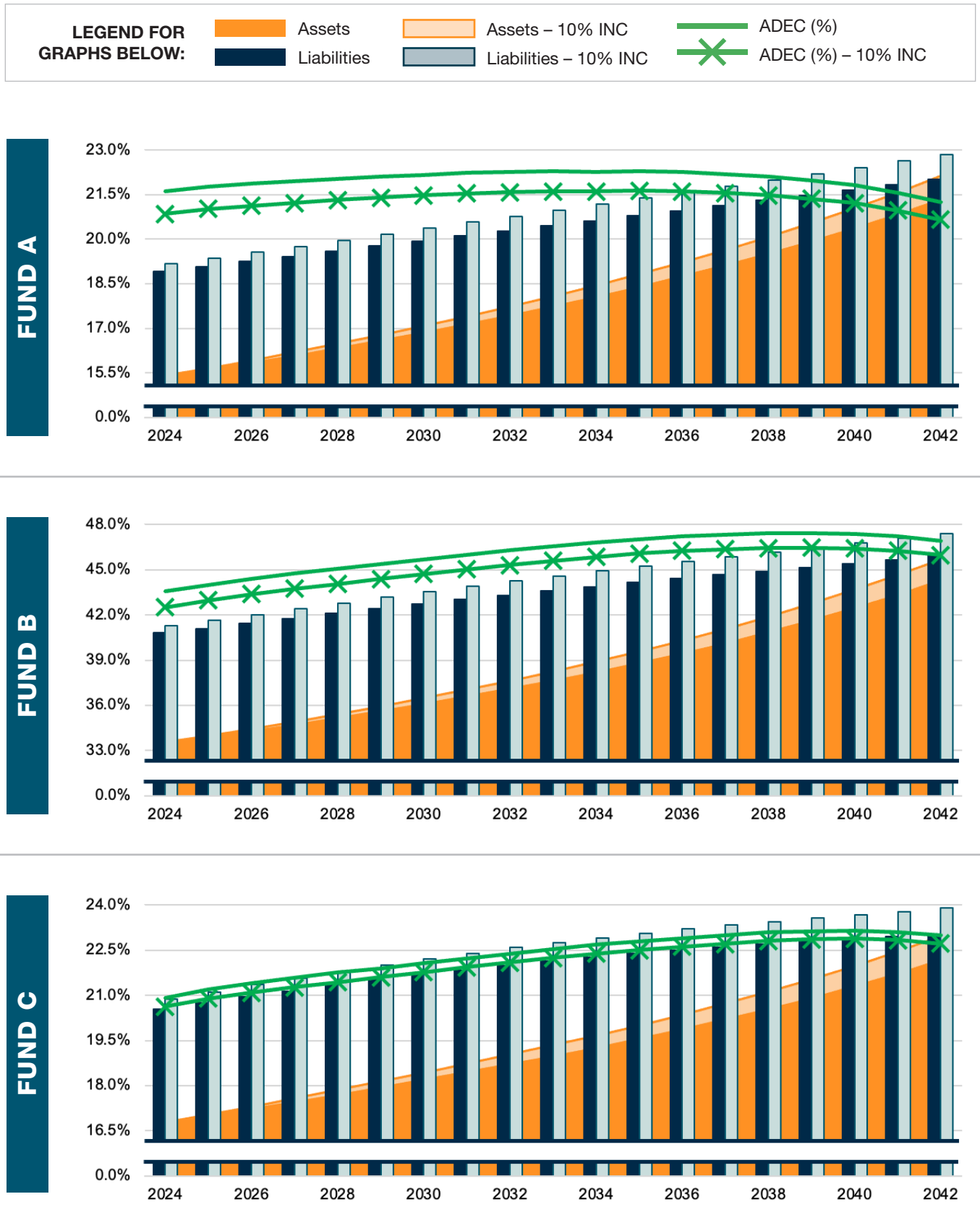
Scenarios Assuming Initial 50% Funded Ratio

Under this scenario, the AVA is set to force the plan to be exactly 50% funded in the initial year. As you can see from **FIGURE 3**, the ADEC as a ***percentage of payroll*** is ***lower*** after the one-time 10% salary bump for all three of the sample plans. This scenario highlights the relevance of having active member salaries on both sides of the C+I = B+E funding equation. The 10% salary bump increases the projected benefit stream B, but also increases the contribution stream C. The employee contribution percentage is fixed while the employer contribution percentage varies based on what is needed to actuarially fund the plan.

In all scenarios, the higher payroll means more dollars for a given percentage of payroll. When the plan is only 50% funded, the ADEC as a percentage of payroll is lower after the 10% salary bump. We note that the ADEC percentage is higher even under the baseline scenario shown In **FIGURE 3** than in either the 80% or 60% funded scenarios shown in **FIGURE 1** and **FIGURE 2**, but that is to be expected because more ground needs to be made up to get from 50% to 100% funded in 20 years rather than from 80% or 60% to 100%.

FIGURE 3 - RESULTS BASED ON 50% FUNDED RATIO

ADEC AS PERCENTAGE OF PAYROLL LOWER FOR ALL FUNDS



Scenarios Assuming 80% Funded Ratio Coupled with a One-Time 15% Asset Loss

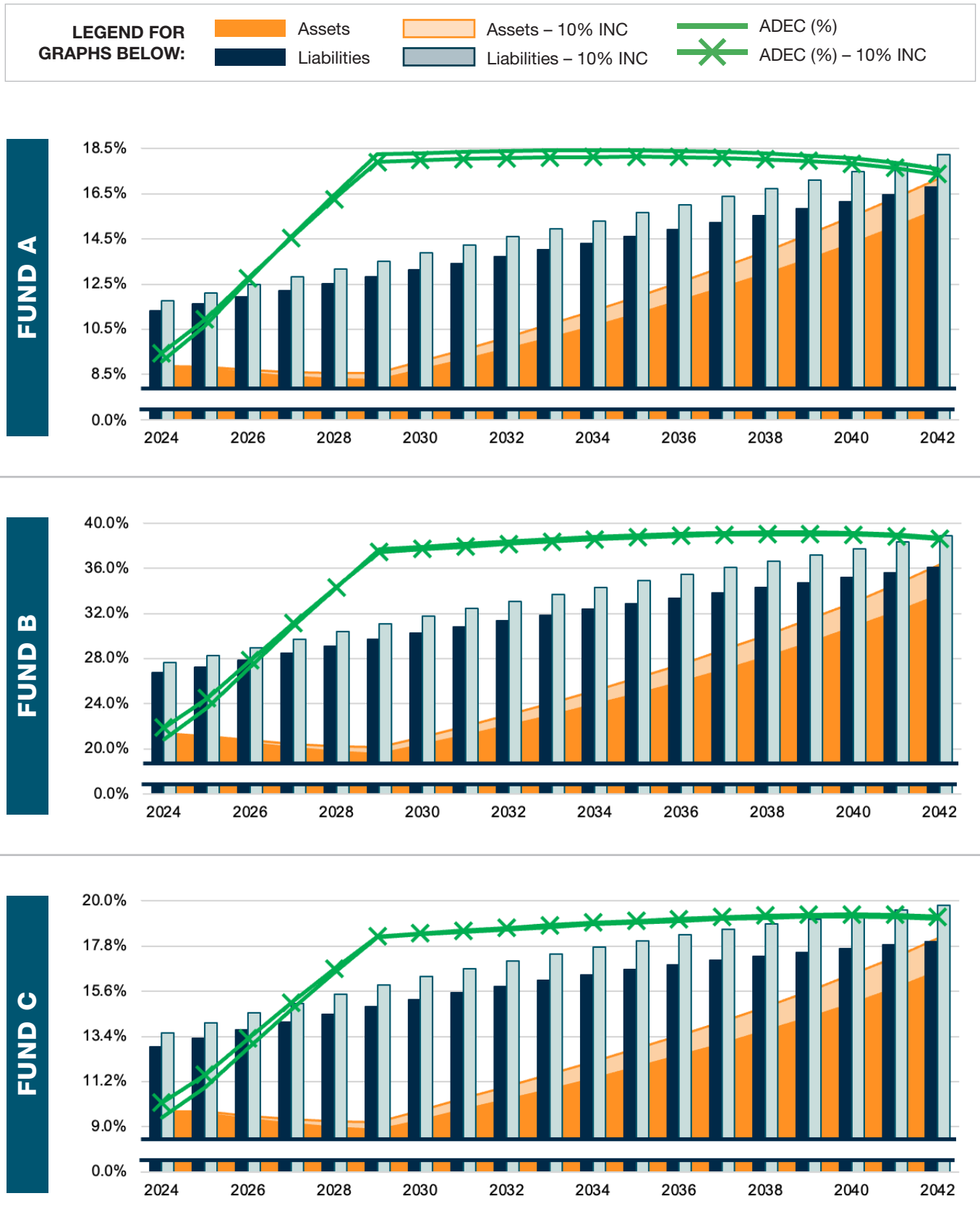
Under this scenario, the AVA starts out equal to the Market Value of Assets (MVA) and is set to force the plan to be exactly 80% funded in the initial year. In year two, however, we applied a 15% asset loss which will be smoothed in over 5 years using the assumed AVA methodology. As you can see in **FIGURE 4**, the impact is similar to the 60% funded ratio scenarios shown in **FIGURE 2**. This result makes sense because the plan, once 80% funded, ultimately becomes approximately 65% funded on an AVA basis with the 15% asset loss since we assume actuarial assumptions are met going forward, with no large offsetting asset gain. The loss is smoothed in over 5 years with the AVA methodology, and is fully recognized once the 5 years are up. This is why the ADEC increases each year for 5 years as it smooths in the asset losses and then stays at the higher value.

As **FIGURE 4** on the following page illustrates, the ultimate 10% salary bump impact under this scenario is similar to starting with a lower funded ratio. The approximately 65% funded scenarios due to the asset shock result in almost identical ADECs as a percentage of payroll when coupled with a 10% salary bump. This result suggests that ***around 65% is the approximate tipping point between funding source and liability impact*** of the 10% salary bumps.

Keep in mind though, just like all of the scenarios studied so far, the accrued liability and assets are always larger with the 10% salary bump as is the dollar amount of the ADEC. It is the ADEC as a percentage of payroll that sometimes levels out or even drops.

FIGURE 4 - RESULTS BASED ON 80% FUNDED RATIO, ONE-TIME 15% ASSET LOSS

ADEC AS PERCENTAGE OF PAYROLL ABOUT THE SAME FOR ALL FUNDS



Declining Active Membership – No Salary Bump

Another possible demographic challenge facing governmental plans, including teacher plans, is a ***declining active member population***. For teacher plans specifically, this could be due to fewer public school children as time goes on because of lower birth rates, increases in homeschooling, and increases in private schooling due to voucher programs. We will analyze this possibility both with and without a one-time salary bump.

In either case, the amortization method for amortizing the UAAL may possibly change from a level percentage of payroll approach to level dollar funding. Under level dollar funding, the amortization payment used to pay off the UAAL is the same every year as a dollar amount, similar to a home mortgage, instead of being a level percentage of a growing payroll amount. This makes the near-term level dollar payments higher and the later term level dollar payments lower than under level percentage of pay funding where the payments grow every year. With declining active headcounts, total active member payroll would be expected to stay approximately level or increase only slightly over the 20-year period if the assumed decline in active membership is about the same as the offsetting assumed payroll growth. Therefore, even without the one-time 10% salary bump we have been modeling, the declining active membership will cause an increase to the ADEC in the near term due to the change in amortization method, as can be seen in **FIGURE 5** and **FIGURE 6** on the following page.

For all declining active membership scenarios, the charts will show projections of the Actuarial Accrued Liability (AAL), the Actuarial Value of Assets (AVA) and Actuarially Determined Employer Contribution (ADEC) both baseline (this section) and after a 10% salary bump (next section) for the 3 sample plans assuming:

- 2% decline in active headcounts each year
- 20-year closed amortization period with a single base
- Amortization using level dollar payments
- Full ADEC is contributed each year
- All other actuarial assumptions are met

Illustrations include both 80% funded ratio (FIGURE 5) and 60% funded ratio (FIGURE 6)

With a declining active membership, the light blue bars (accrued liability with the decline) are lower than the baseline dark blue bars. This is because with fewer actives over time, the liability is less since there are fewer future benefits to pay out. However, the dollar amount of the ADEC most likely will be calculated differently (level dollar instead of level percentage of payroll) and the payroll base used for the contributions will be relatively flat or only slightly increasing. For Funds B and C, the payroll growth assumption is higher than the 2% membership decline modeled here, so the flat dollar ADEC drops as a percent of payroll since the payroll rises slightly rather than being exactly flat. But the ADEC as a percent of payroll is always larger with the declining active membership than with a flat active membership, even with no salary bump. This is true under both the 80% and 60% funded scenarios.

FIGURE 5

BASELINE AND DECLINING POPULATION RESULTS BASED ON 80% FUNDED RATIO – NO SALARY BUMP

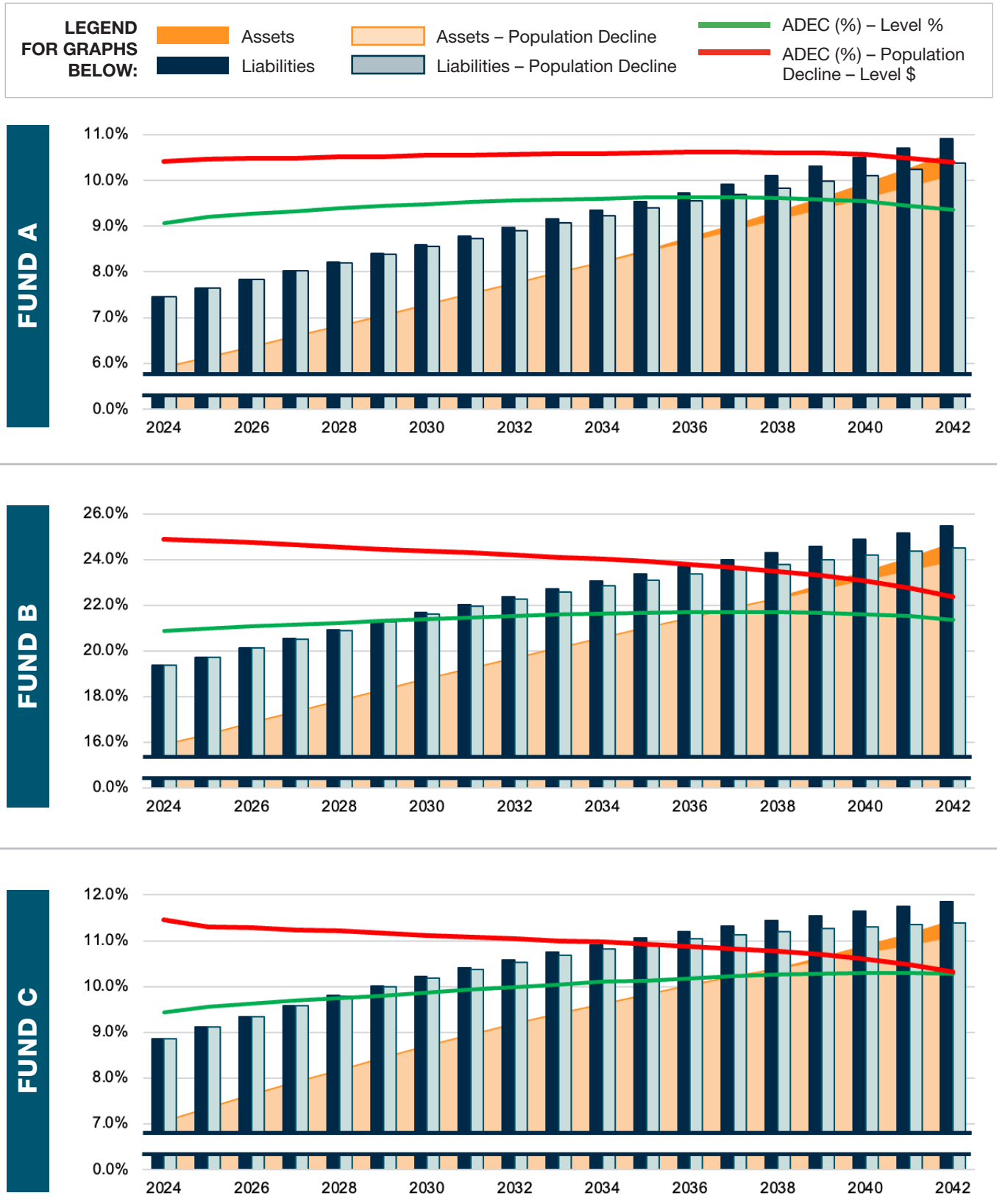
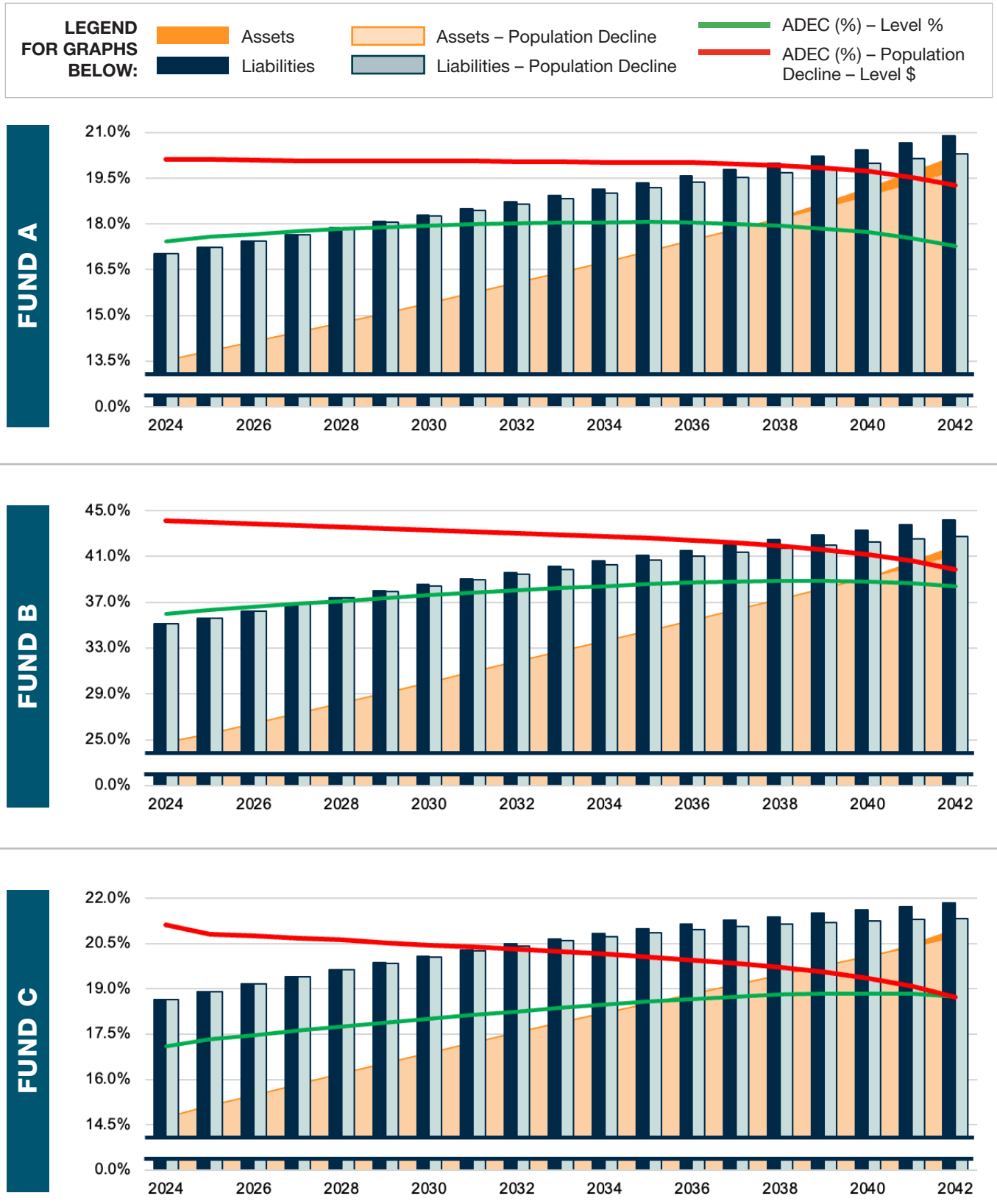


FIGURE 6

BASELINE AND DECLINING POPULATION RESULTS BASED ON 60% FUNDED RATIO – NO SALARY BUMP



Declining Active Membership – 10% Salary Bump

The declining active membership scenario could be coupled with the 10% salary bump scenario, particularly if the same demographic challenges that lead to a smaller public school student population also lead to labor shortages requiring higher wages. **FIGURES 7** and **8** show the ADECs as a percentage of payroll for the declining active membership scenarios after a 10% salary bump for each of the three sample funds at either 80% or 60% funded. The ***amortization method*** is level dollar since the active membership is declining, but the ADEC itself is shown as a percentage of payroll. As you can see, the results are similar to the first set of exhibits in that the plans that are 80% funded have an increase to their ADEC as a percentage of payroll after the 10% salary bump while the plans that are 60% funded have an ADEC that is either lower or equivalent as a percentage of payroll after the 10% salary bump.

LEGEND FOR GRAPHS BELOW:

- ADEC (%) – FUND A
- ADEC (%) – FUND B
- ADEC (%) – FUND C
- ADEC (%) – 10% INC – FUND A
- ADEC (%) – 10% INC – FUND B
- ADEC (%) – 10% INC – FUND C

FIGURE 7

RESULTS BASED ON 80% FUNDED RATIO AND DECLINING POPULATION

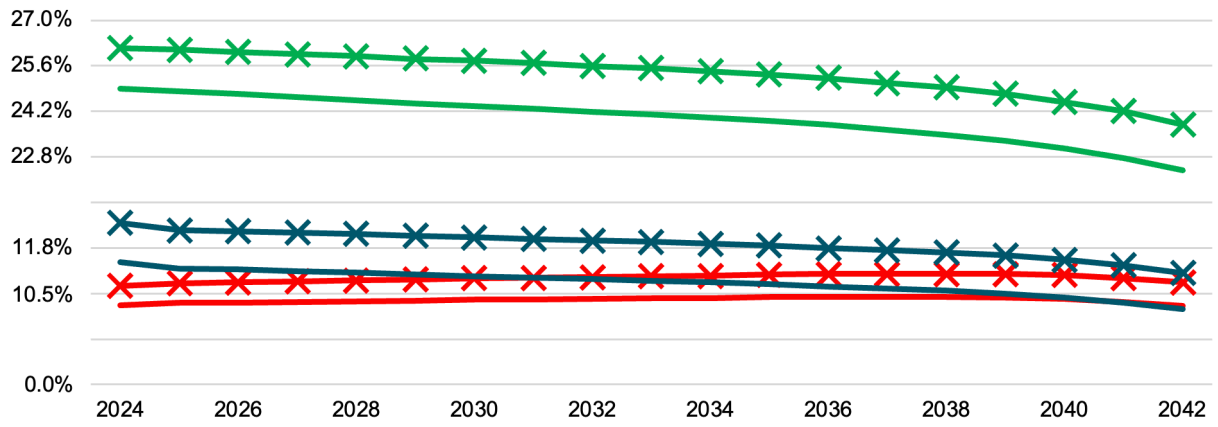
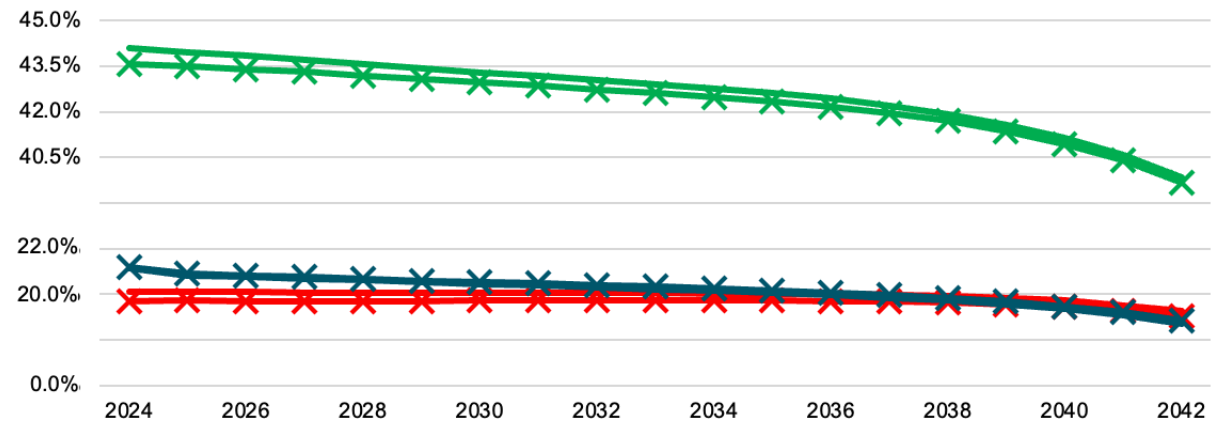


FIGURE 8

RESULTS BASED ON 60% FUNDED RATIO AND DECLINING POPULATION



FIXED RATE PLANS

What if you have a fixed rate plan rather than one that is funding actuarially? In that case, you will definitely get more contribution dollars into the plan with a one-time 10% salary bump, since both the employee and employer contributions are fixed percentages that are now applied to a higher payroll. The question is whether these higher dollar contributions are enough to pay for the higher active liabilities over the same timeframe as before, or if it pushes out the date of 100% funded status beyond that of the baseline.

For all fixed rate plan scenarios, the TABLES show when the plan is expected to reach a 100% funded ratio both baseline and after a 10% salary bump for the 3 sample plans assuming:

- Level active headcounts
- A fixed rate similar to the ADECs shown in **FIGURE 1** and **FIGURE 2** with 20-year closed amortization period with a single base
  - Plan 1 = 15%
  - Plan 2 = 35%
  - Plan 3 = 15%
- Fixed rate as percent of payroll is contributed each year
- All other actuarial assumptions are met
- Illustrations include both an 80% funded ratio and a 60% funded ratio

The **TABLE 2** below shows the date the plans become 100% funded under the baseline and 10% salary bump scenario for each plan. As you can see, the results are similar to the actuarially funded plans in that at 80% funded, the 10% salary bump is more impactful on the liability side and adds a year or two to the date full-funding is reached. At 60% funded, the 10% salary bump is more impactful as a funding source and potentially lowers the number of years until full funding is reached.

80% FUNDED RATIO	Fund A	Fund B	Fund C
Baseline	2034	2033	2034
10% Salary Bump	2035	2034	2036

60% FUNDED RATIO	Fund A	Fund B	Fund C
Baseline	2053	2048	2055
10% Salary Bump	2052	2047	2055

OPEB PLANS

Finally, what about your OPEB plan? OPEB plans provide Other Post-Employment Benefits that are other than pensions. This usually means retiree healthcare, but can include stand-alone life insurance, disability or long-term care plans. OPEB plan benefits can sometimes be dependent on salary, such as salary continuation long-term disability plans, life insurance plans that pay a benefit equal to some percentage of pay or Health Reimbursement Accounts (HRA) where employer contributions are based on pay. However, it is more likely that the benefit is not based on salary, such as retiree healthcare, HRAs with flat dollar contributions, or fixed dollar retiree life insurance. The funding for these plans can be either actuarially based or dependent on a wide variety of other funding arrangements that are outside the scope of this paper. To the extent the OPEB benefits are not pay related, excess salary increases do not increase benefits.

But, if the funding source is calculated as a percentage of payroll, higher than expected salary increases lead to more funding. In this case, salary bumps provide increased contributions without increasing the benefits in the funding equation.

CONCLUSION

Public retirement systems are fundamentally shaped by the salary structures of their members. Recent and/or potential future trends in excess salary increases, whether due to collective bargaining agreements, promotional incentives or labor shortages, can have significant and sometimes unexpected consequences on public retirement systems. While the focus is often concentrated on rising liabilities, salary increases also affect assets through increased employee and employer contributions.

As this paper demonstrates, the interplay between increased liabilities and increased funding caused by excess salary increases depends on several factors discussed above. Plans could also be potentially faced with other demographic pressures such as a declining active membership. The takeaway from this paper is that, all things being equal, when excess salary increases or salary bumps occur, they impact both sides of the funding equation C+I=B+E. Which component has a bigger impact depends largely on how many contributions were expected to be needed in the first place.

The good news is that while increased salaries are good for the public sector active workforce and provide for higher pension benefits, the increased employer and employee contributions as a percentage of payroll also help to mitigate the increased costs to the retirement system.

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