



MACKENZIE
Investments

The Looming Pension Crisis Part III

U.S. Public Pension Plans

November 2019

Series summary:

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Our first paper in this series outlined the critical role aging demographics and the unsustainability of defined benefit plans have on the looming global pension crisis. Our second paper described the relative risks and country rankings associated with government pension plans globally. This paper focuses on the U.S. Public Pension System. Given the global importance of the U.S. as the dominant economic superpower and its signalling influence on other nations, an in-depth look is justified. We examine the unsustainable assumptions that misguide the current valuations of U.S. public pension plans. Using proprietary models, we objectively assess individual state plans and associated risks that threaten the status of the pension system as we know it.

Key takeaways

- High discount rates have allowed public pension plans to devalue their liabilities at rates that do not reflect the guaranteed nature of their benefits
- Plan liabilities often exceed published values by over 50%, which could aggregate to a shortfall of US\$3 trillion when discount rates and growth assumptions are adapted to a proposed sustainable industry standard
- Large equity allocations portend that pension fund returns are poorly aligned with their promised payouts, as they are vulnerable to equity market corrections
- Aging demographics strain state budgets in at least three ways: more retirees receiving pension payments, generally increasing old-age benefits and higher health care costs

The Looming Pension Crisis Series:

Part I: [Why it matters and how to prepare](#)

Part II: [Government pension plans](#)



A flawed system

The United States Public Pension System was established on the fundamental principle of providing guaranteed retirement security to tenured workers. Worker contributions were to be invested responsibly to promote stable, sustainable returns, allowing funds to maintain payments to beneficiaries while permitting modest growth. Plans were required to evaluate their solvency (the ratio between the market-valued assets to the present-valued liabilities), using data where possible and assumptions when not. Those assumptions have changed little over the decades and do not appear to be an appropriate reflection of reality.

While it is common knowledge in some circles that many state-level pension plans are underfunded, many Americans (and investors globally) are unaware of the true magnitude of these deficits. Plan liabilities are a key feature of state financial reporting, but these values have been calculated under extraordinary assumptions, created through plans placing inappropriate risk and volatility in their funds. Public pension systems have justified these risks under the proposition that governments may absorb deficits and generate revenues through taxes, as opposed to companies that risk inevitable bankruptcy. However, because states do not have the ability to print their own money or stop residents from moving, public pension systems are in many regards, more like companies than countries. This paper will highlight the inadequacies and deficits that have been dismissed through assumptions that are inconsistent with the guaranteed nature of pension benefits. Further, it will examine the absolute and relative effects of reducing plan assumptions to sustainable standards.

A thorough understanding of state pension issues could cause a rise in fundamental concerns and detrimentally shift perception from “Will the pension system collapse?” to “When will the pension system collapse?” – and perhaps more importantly, as an investor, “Who is most at risk?”

Model outline

The Mackenzie Fixed Income Team has a strong background in building data-driven research models to assess and evaluate economic opportunities across fixed income assets both domestically and globally. Given the potential for glaringly underfunded liabilities within the state pension system to trigger a nationwide economic crisis, our team was inspired to model the actuarial present value of pension plan liabilities.

Our model is composed of seven indicators, each with a series of sub-indicators. The indicators and quantitative sub-indicators are weighted and assessed by their relative significance. We examined 177 individual plans across each of the 50 states including the District of Columbia, totalling 95% of defined benefit pension plan assets across U.S.. The table on page 4 is an overview of our seven indicators and their breakdown.

While our model uses data from many existing sources covering a wide array of topics, the majority of our focus was on four elements critical to pension plan success. Those elements are the discount rate (the rate used to determine if a plan has enough assets to cover future liabilities), the return on assets, contributions and redemption rates.

U.S. public pension plan model

Overall indicator	Number of sub-indicators	Description
Pension funded status	7	Plan liabilities and deficits weighted relative to plan assets, state GDP, and officially presented values to determine the relative magnitude and significance
Fund accountability	9	Analyzes state and plan efforts to reduce their equity risk and increase contributions to recognize and improve their funding status
Cash flow	9	Projecting the rate and significance of the depletion in pension fund assets at the state level as well as contribution amounts
State debt obligations	2	The relative measure of existing state debt obligations and pressure on state-level government systems
Payment abilities	5	Evaluating a state's ability to generate excess funds either internally through budget adjustments, or through borrowing money
Tax base strength	6	Investigating the quality of life, economic diversity and state success by examining population traits and trends
Demographics	4	Estimates the absolute and relative impacts of an aging population on state government spending by examining current demographics and demographic trends

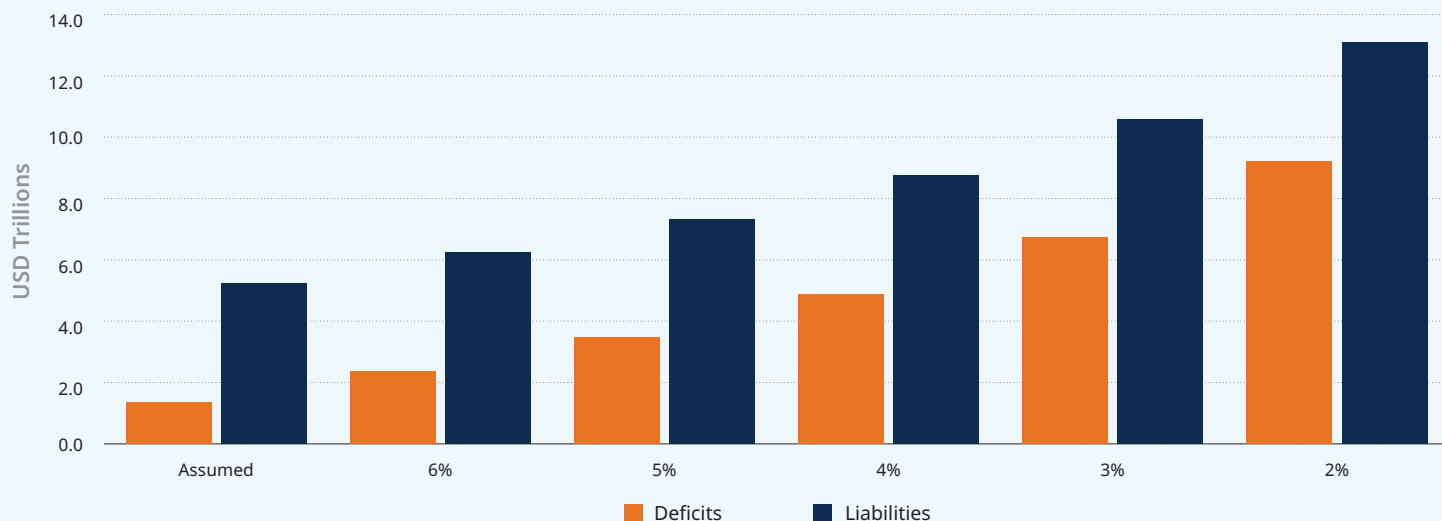
High-level findings

The discount rate is the most critical element when calculating a plan's expected liabilities, as it is the factor by which expected liabilities are annually reduced when converting to the present value. Reverse engineering this formula allows us to change the discount and asset growth rate to levels more in line with reality. In doing so, we were able to project the true value of plan liabilities by applying an industry-standard discount rate of 4% and return rates of 5%. This stands in stark contrast to the average discount rate of 7.1% and a plan asset growth rate of 7.6%.

Using our adjusted model to restate plan liabilities, we estimate that liabilities are 56% greater than currently believed. In dollar terms, we estimate that the net deficit is understated by almost US\$3 trillion (from US\$1.3 trillion to US\$4.25 trillion). This would mean funded ratios are only 47%, not 74%. This shortfall would certainly be a shock to the financial system and future taxpayers. The chart on page 5 illustrates our startling conclusion; it shows the growth in liabilities and pension deficits when moving from a 7.1% discount rate to more realistic assumptions.

How assumption changes impact present value of liabilities and deficits

Plan outcomes are highly sensitive to changing discount rate assumptions



Source: Mackenzie Investments

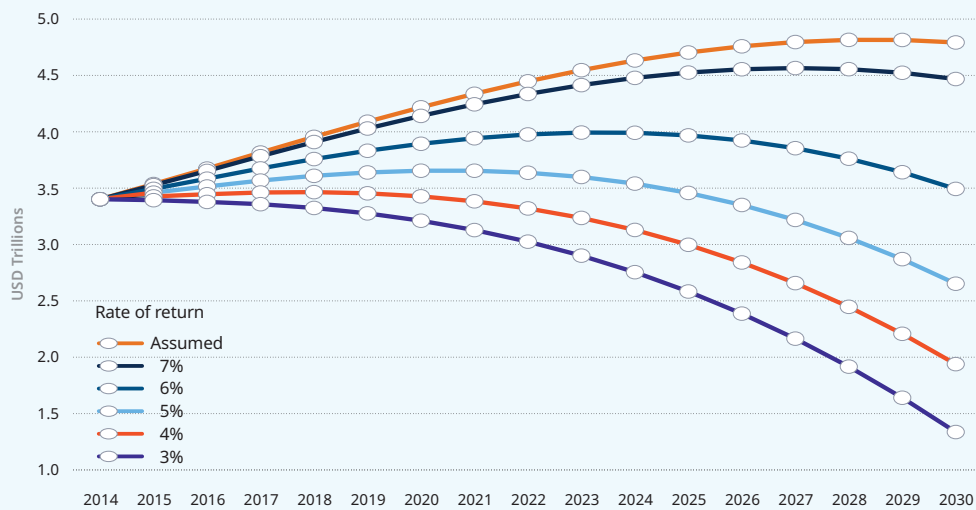
Cash flows are extremely important to sustaining pension schemes. Plans where contribution amounts or the ratio of workers to retirees is high can be sustained even if the asset base is small. When examining projected cash flows, our team was most interested in viewing the relative performance of funds, before aggregating it up on a state. For this analysis, we used historical data, growth trends and regression analysis to project trends in contributions, benefit payments and asset growth to the end of 2030. Our model focused on detecting when and where cracks may appear in the pension system and predicting their relative severity.

Our work shows that current assets are insufficient to fund national pension promises. Adding to the problem is that pension plans remain invested in highly volatile assets, with two-thirds invested in equities and other risky assets. In a way, this appears to be comparable to a “Hail Mary” attempt by a football quarterback whose team is trailing

by two touchdowns with only minutes left in the final quarter. While we believe in the long-term benefits of risky assets, the state of the pension system has moved from an accumulation phase to a pay-out position. Traditionally, this should also encompass a transition from an equity-heavy portfolio to bond-based holdings. Given the predictability of future commitments – it can be further be argued that this represents leverage and therefore an even larger equity risk than represented by just looking at the current allocation.

Our model reviewed the potential impact of different rates of return on total pension plan assets. From this exercise, we observed that even with rates of return as high as those expected (on average 7.6%, which is not too dissimilar to the discount rate), 34 states will turn cashflow negative by 2030. We can see in the chart at the top of page 6 that, on a federal scale, this statement rings true, with asset slopes turning negative by 2030 – even when using plans’ assumed rates.

Projected growth in state pension plan assets from 2014 to 2030



Source: Mackenzie Investments

10 years

Using even the highest level of currently “assumed returns,” state pension assets will be in decline within 10 years – just as the youngest Baby Boomers reach retirement age.

Best and worst states ranked by indicator*

Overall indicator	Top-ranked states	Bottom-ranked states
Pension Funded Status	District of Columbia, Utah, Indiana	Mississippi, Nevada, Illinois, Kentucky
Fund Accountability	District of Columbia, Washington, North Dakota	West Virginia, Wyoming, Texas
Cash Flow	District of Columbia, Washington, North Dakota	Colorado, Kentucky, New Jersey
State Debt Obligations	Wyoming, Idaho, North Carolina	New York, Rhode Island, Kentucky
Payment Abilities	North Dakota, Montana, Utah	Illinois, New Jersey
Tax Base Strength	District of Columbia, Colorado, Washington	Delaware, Wyoming, New Mexico
Demographics	District of Columbia, Utah, Texas	New Mexico, Wyoming, Florida

*While this table shows the top- and bottom-ranked states by the overall indicator, each state was also ranked by each sub-indicator.



Findings by indicator



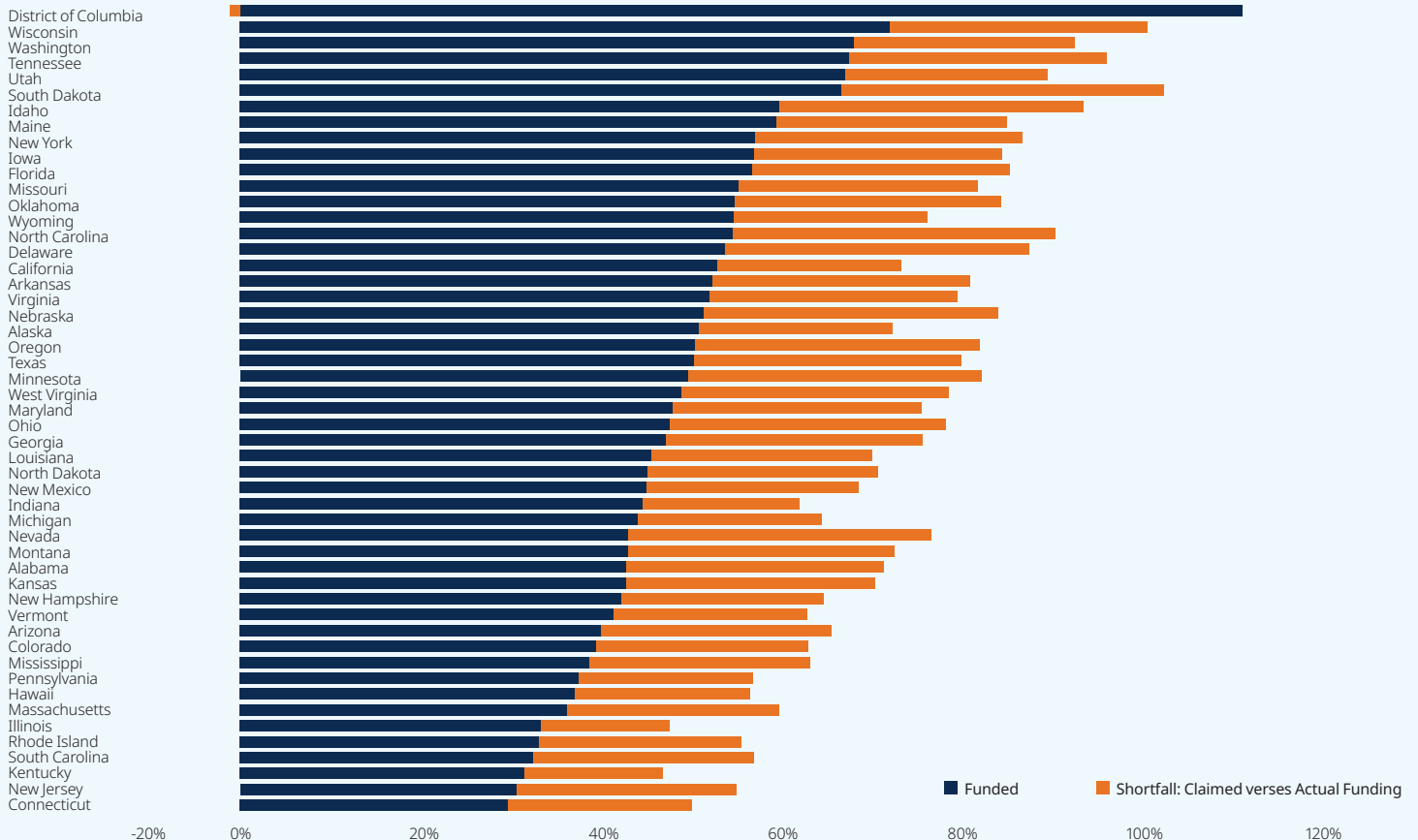
Indicator: pension funded status

The most important and, therefore, highest-weighted indicator in our model is "Pension Funded Status". Its sub-indicators focus on examining the adjusted liabilities against market valued assets, state GDP and reported liabilities. This indicator determines the sustainability and probability of pension obligations being honoured. This data was utilized in conjunction with six additional indicators to effectively evaluate state funding. We found six plans with liabilities exceeding the value of their assets by three times, indicating a significant funding deficit. With Kentucky's pension crisis well documented, New Jersey's and Illinois' pension plans are also similarly positioned, with their underfunding stemming from an inability to assist the funds due to high levels of existing debt. Examining plan funded ratios, we determined that the District of Columbia has the only properly solvent

pension plan, with Wisconsin (71%) and Washington (67%) coming in second and third, respectively. It is hard to reconcile the previously stated nationwide funding status at 74% when we found only one state is at or above that level when adjusting the assumptions. This underscores the significance and magnitude of deception presented within the U.S. public pension systems.

States such as Mississippi and New Mexico saw their rankings drop to the lowest decile partly as a result of their relatively low GDP, despite a moderately ranked funded ratio. This creates increased cause for concern, as low GDP per capita is generally tied to lower wage levels and sometimes also increased household debt, compounding to create a situation where neither the plans nor the individual parties are sufficiently prepared for the retirement wave.

The shortfall (orange) between claimed and actual funding can be significant





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Findings by indicator



Indicator: fund accountability

When examining the progress of pension funds over time, a significant factor in determining long-term sustainability was to evaluate the progression of fund accountability. Ideally, pension funds take steps to account for and reduce plan liabilities through consistently increasing employer contributions and using conservative asset growth assumptions. Our model further evaluates each state's respective efforts to recognize and reduce equity risk while decreasing plan deficits. This indicator revealed that allocations to equity risk have remained mainly stagnant in the short term, but over the long term there have been moderate increases. The allocation to equities and comparable moderate-to-high-risk holdings is now about 65%.

Top states such as Washington and Kansas have a lower allocation to higher risk (equity) assets at 55%, while high-risk states (Louisiana, West Virginia) are 75% exposed to volatile assets. Although states nearly always met the recommended payment amount to marginally reduce liabilities, very few consistently made efforts to exceed these recommendations. By contrast, New Jersey and Illinois fell short at 62% and 77%, respectively, of recommended payments and, therefore, were two of our poorest-ranked states. Accountability for pension fund growth is often secondary to other government obligations given the lack of media appeal and knowledge surrounding their respective flaws. This is particularly threatening to states with significant debt levels such as New Jersey and Illinois that are unable to consistently increase their contributions and have become reliant on equity market gains to grow plan assets.



Indicator: cash flow

With old-age dependency ratios set to accelerate upward in years to come, we expect that plans will consistently trend toward negative cash flows. The two most-telling metrics when projecting a plan's solvency are the rate of depletion and length of time until becoming cash flow negative. Closely tied to funding ratios, Kentucky, Colorado and New Jersey combine for some of the country's worst-funded plans, leading to a rapid deterioration of plan assets. Using our suggested rate of return, each of these plans is projected to lose significant portions of its assets before the retirement of the youngest Baby Boomers.



Indicator: state debt obligations

Examining a state's overall solvency is paramount to determining the relative feasibility of a state's ability to honour any additional deficits. States with large financial deficits have limited freedom concerning their allocation of discretionary spending. While debt is consistently rising across most states, we see the potential for debt to compound and a higher risk of critical funding being diverted from state pensions as a result of the vested interests and obligations to debtors. Our top eight performers had less than 10% net debt, while Wyoming is effectively net debt-free owing to a strong state reserve fund. New York is in the least favourable situation, as it is the only state with net debt exceeding 20% of GDP.



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Findings by indicator



Indicator: payment abilities

For plans to avoid a default on their pension obligations, they may have to absorb growing expenses directly into their budgets (generally by issuing debt). The internal feasibility of these options was determined by analyzing the projected annual budget balances of each state while observing trends in significant expenses such as Medicaid and other old-age benefits through social services.

We found that several states within the oil and gas industry were generating budget surpluses, with North Dakota, Montana and Wyoming near the top, while states such as New Jersey and Illinois performed poorly once again.

We see a moderate correlation between a state's ability to finance deficits internally and their ability to increase publicly issued debt. Examining state credit spreads and average credit ratings allowed our team to evaluate the ease and financial viability of each state to borrow money to reduce plan deficits. State debt and budget balances were a key factor in this determination. Montana, Vermont and Utah were high performers, while Illinois and New Jersey are weighed down again by their substantial debt load and poor aggregate credit.



Indicator: tax base strength

Examining the success and satisfaction of state populations is essential to projecting migration trends, retirement hubs and motivation to work and retire in a given state. We saw that states such as West Virginia and Mississippi were each struggling in the Human Development Index categories, evidenced also by negative net migration rates. Positively, Washington, Colorado and the District of Columbia are elevated to the higher ranks, given their diverse economies, solid GDP per capita values and sustainable migration rates to entice the working population and stimulate growth.



Indicator: demographics

While demographics and, most significantly, a state's average tenure in retirement, are crucial factors in pension liability calculations, it is essential that our model considers the relative positioning of each state and projected trends concerning their old-age dependency ratios. Positive trends emerged in top performers such as the District of Columbia and Utah, with favourable demographics setting the stage for success in numerous categories, with a consistently strong working class to support the proportionately lower elderly populations. Reviewing the model, we determined which states are classified as retirement hubs and predicted which states will be pushed beyond capacity concerning projected increases in health care and Medicaid spending. With high volumes of migration among the elderly, Florida has consistently been valued as a retirement hub. U.S. census data suggests that New Mexico and Wyoming will be most affected by demographic trends, with the least favourable absolute and relative change factors. With an average age growth of 5% (in the 65-year-plus age category as a percentage of total population) projected nationwide by 2030, these states will face the most severe consequences, with growth rates double that of the national average.

Overall results:

Our model ranked the state results from “most prepared” to “least prepared” (see chart below). While the overall trends were consistent with our initial expectations, we were surprised by some of the specific positions. Perhaps most surprising was Utah’s rank as the most prepared state. With some of the model’s top scores in pension funding, payment abilities and demographics, Utah appears relatively well-equipped to handle their pension deficits. The ability to source funding, given low debts and strong credit, are well-paired with a relatively positive cash flow projection. Washington and Tennessee were also very strong performers, only reduced in value by high state debt and somewhat poor cash flows, respectively.

When determining the model’s respective weightings, the presented case was to measure each state’s ability to fix its own pension plans without a federal bailout. Mississippi and New Mexico were particularly affected by this measure within the pension funding indicator, as were Kentucky, Rhode Island and New Mexico within the scope of debt obligations. Poor performances for states such as Illinois and New York are particularly concerning given their large deficits, both relatively and absolutely, with well over US\$700 billion in projected funding deficits.

Pension preparedness ranking from best (Utah) to worst (Kentucky)

State	Rank	State	Rank	State	Rank
Utah	1	New Hampshire	18	Alabama	35
District of Columbia	2	Wyoming	19	Pennsylvania	36
Tennessee	3	Vermont	20	Louisiana	37
Washington	4	Florida	21	West Virginia	38
Idaho	5	Wisconsin	22	Arizona	39
North Carolina	6	Texas	23	Ohio	40
Oklahoma	7	California	24	Hawaii	41
Iowa	8	Minnesota	25	New York	42
North Dakota	9	Michigan	26	Rhode Island	43
South Dakota	10	Missouri	27	Connecticut	44
Virginia	11	Arkansas	28	Nevada	45
Nebraska	12	Alaska	29	South Carolina	46
Maryland	13	Kansas	30	Mississippi	47
Indiana	14	Colorado	31	New Jersey	48
Maine	15	Montana	32	Illinois	49
Delaware	16	Oregon	33	New Mexico	50
Georgia	17	Massachusetts	34	Kentucky	51



Political implications

While states may not completely recognize the magnitude of their fund's deficit or the implications of the plans' financial assumptions, from Kentucky we witnessed the public's negative response when the truth about its poorly funded plan was revealed. Inevitably, states could be tasked with supplying billions of dollars annually to sustain fund balances against aging populations, leaving their citizens to wonder, "Where will the money come from?"

State governments will be stuck between a rock and a hard place when considering the options to increase revenue or cut expenses to generate additional funds to finance the pension system. The alternative is to obtain capital externally through issuing debt. Each of these options leaves state constituents in a worse position, favouring pensioners and increasing the burden on workers through either a decrease in take-home earnings or by a reduction of state funding and reserves. Controversially, plans could also move to reduce pension benefits either through limiting the percentage of salary received or increasing the minimum retirement ages to receive benefits.

Many states have already challenged constitutional protections aiming to transition into contractual or limited protections to curtail the potential impact of a plan collapse. The fundamental and essential nature of many public pension services severely curbs the probability of complete or major cuts. Significant cuts, should they happen, would likely lead to a massive public outcry as more than one in 10 workers have a stake in the pension system. Cuts could result in an unprecedented risk for worker strikes, government shutdowns and possibly a deterioration in American civil services.

In the lead up to the pension crisis, we anticipate an increasing division of age demographics within politics. When considering pension reform, politicians and governments will likely have to select which demographic they wish to prioritize: the young working-class, who has the most to lose from state tax hikes and cuts to social services, or elderly pensioners and middle-aged workers who have worked for many years and contributed their salaries, and are now dependant on pension plans being honoured.

In our view, action favouring either side looks equivalent to political suicide. This inequality will invariably lead to an increasingly aggressive political divide, with each side looking to protect their earnings, regardless of the cost to the other. Politicians depend on voters to stay in power and they will generally shy away from touching retirement benefits, particularly given the size of the Boomer generation. A shift to the left seems all but unavoidable, with alternative solutions such as MMT (modern monetary theory) or central bank slush funds gaining in popularity as possible ways to tackle the many large problems ahead of us.

What we hope to see in the wake of a potential bailout would be the dismantling of the assumptions and vested interests that are currently plaguing the defined benefit pension system. Discount rates and rates of return would be capped when calculating present-valued liabilities, with values indicative of the guaranteed nature of their government-backed benefits. Additionally, we believe that requiring governments to maintain an appropriate funding level between pension funds and state-level reserves, paired with a mandate requiring a certain percentage of holdings to be invested in low-risk government securities, would improve the sustainability of the pension system moving forward. While the pension crisis appears imminent, our team believes that by identifying the problems now and acting proactively, the groundwork may be laid to reduce the financial devastation and allow the pension system to gradually reinvent itself.

Investment implications

There are many investment implications for the Mackenzie Fixed Income Team. The findings from our U.S. Pension Plan model will be one of many information outlets carefully considered by the team in portfolio construction and positioning. Results from the model and developments over time will be monitored so we can objectively select states that improve their position, as we believe they are likely to be rewarded in the marketplace through access to favourable debt issuance rates. Significant deterioration in positioning will insinuate the widening of credit spreads and deterioration of a state's credit rating, compounding their downward momentum and negative results.

Ultimately, the state pension problem, in conjunction with other issues, seems too large to completely fix on a state-by-state level. A federal bail-out is plausible to us, but only after significant pain has been endured. We believe that several states will need to declare their inability to service their pension obligation, threatening to quash any confidence in the entire pension system. In our view, concerns about funding will lead to lower aggregate demand, slower growth, lower equity prices and ever-declining funding ratios. A bail-out is likely the least-worst decision before creating lasting economic pain.

Over the last decade, the Mackenzie Fixed Income Team has strengthened its technical abilities to process and analyze relevant data. The team can objectively rank the strengths and weaknesses of various assets, currencies, states or countries. We believe this provides our team with an edge in managing fixed income assets in an ever-changing geopolitical landscape as countries and companies become progressively interconnected. Our model that examines the U.S. Public Pension System, as well as our global pension preparedness model, are two significant examples used to evaluate the perceived strength of countries and regions against the global retirement crisis.

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