UNIVERSITY OF CALIFORNIA

Ahmet Palazoglu
Chair, Assembly of the Academic Senate
Faculty Representative, UC Board of Regents

Academic Senate

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Oakland, CA 94607

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July 30, 2026

Nathan Brostrom
Executive Vice President & Chief Financial Officer, UC Finance

Re: Recommendation to Increase the Actuarial Rate of Return for UCRP

Dear CFO Brostrom:

At the July 22, 2026 meeting, the Academic Council unanimously endorsed the recommendation of the University Committee on Faculty Welfare (UCFW) and its Task Force on Investments and Retirement (TFIR) to increase the assumed actuarial rate of return for the University of California Retirement Plan (UCRP) from 6.75% to 7.25%.

Council first reviewed the proposal at our June 2026 meeting, when TFIR presented its analysis of UCRP's long-term investment performance, funding position, and cash flows. TFIR concluded that the current assumption is unnecessarily conservative and increasing it to 7.25% would better reflect expected long-term returns, reduce unnecessary contribution requirements, and preserve resources for the University's core mission without reducing pension benefits.

Before taking action, Council asked the University Committee on Planning and Budget (UCPB) to review the proposal. UCPB subsequently endorsed the proposed increase, while emphasizing the importance of adhering to Regents Policy 5601. Council agreed that UC should follow the policy's established mechanisms for adjusting contributions when investment performance differs from actuarial assumptions and that future funding shortfalls should not be addressed by shifting additional costs to University employees.

Council recognizes that the actuarial rate is a long-term planning assumption rather than a guarantee of future investment performance. Nevertheless, Council concluded that the evidence presented by TFIR supports the proposed 7.25% rate and that maintaining an unnecessarily conservative assumption carries substantial opportunity costs for UC.

I am forwarding the attached UCFW-TFIR proposal and UCPB endorsement for your consideration as the University reviews the actuarial assumptions governing UCRP.

Sincerely,

Ahmet Palazoglu
Chair, Academic Council

cc: Academic Council
Chief Investment Officer Bachher
Executive Vice President and Chief Operating Officer Nava
Vice President Henderson
UCFW Chair Bales
TFIR Chair Hollenbach
UCPB Chair Brosnan
Senate Division Executive Directors
Senate Executive Director Lin

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UNIVERSITY COMMITTEE ON PLANNING AND BUDGET (UCPB)
Robert Brosnan
rjbrosnan@ucdavis.edu

July 10, 2026

Ahmet Palazoglu
Chair, Academic Council

RE: UCPB Response to Task Force on Investment and Retirement (TFIR) Proposal for Pension Investment Assumptions

Dear Ahmet:

UCPB reviewed the TFIR proposal to increase the assumed rate of return from 6.75% to 7.25%, including the presentation to the Academic Council on June 24, the TFIR proposal from UCFW dated June 16, responses to UCPB questions from TFIR dated June 27 (enclosed), and consultation with TFIR representatives David Brownstone and Jim Chalfant during the July 7 UCPB meeting. UCPB also consulted with CFO Nathan Brostrom on this proposal. UCPB requests for consultation with UC Investments were declined.

The 2024 actuarial valuation of UCRP conducted by Segal assumed a 6.75% investment rate of return that was approved by the Regents (https://regents.universityofcalifornia.edu/regmeet/nov24/f11attach1.pdf). However, UCOP's current plan contributions to UCRP do not meet UC's own policy contribution rate requirements to achieve 100% funded status for an assumed 6.75% rate of return. TFIR's proposal to adjust the assumed investment rate of return to 7.25% is based on investment modeling using a portfolio of stocks, bonds, and cash/treasuries similar to that held by UCRP and with bootstrapped rates of return from the previous 98 years (periods that include several economic depressions and recessions and stock market crashes). TFIR's higher assumed rate of return appears to be a reasonable and data-driven estimate of median future investment returns. This is important because when the assumed rate of investment return is set too low, UCOP must unnecessarily contribute funds to UCRP that could otherwise be used to support the teaching, research, and service missions of the University. Additionally, an excessively conservative assumed rate of return may encourage a lack of

discipline in meeting the required contributions.

UCPB is supportive of changing the assumed rate of return to 7.25%. However, UCPB also emphasizes that this **must** be done with strict adherence to Regental Policy 5601 "Policy on University of California Retirement Plan Funding" (https://regents.universityofcalifornia.edu/governance/policies/5601.html) so that contributions are increased in a timely manner following portfolio losses or insufficient gains to ensure that UCRP remains adequately funded. With this higher assumed rate of return, UCOP **must** always meet policy contribution rate requirements to achieve 100% funded status. Finally, just as UCOP should reap the benefits of investment overperformance, any shortfalls in UCRP funding caused by poor investment performance should be addressed by increased contributions from UCOP and **not** from the faculty or staff.

Sincerely,

Robert Brosnan
Chair

Enclosure: DRAFT Responses to Questions From UCPB: June 27, 2026

cc: UCPB

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UNIVERSITY COMMITTEE ON FACULTY WELFARE
KAREN BALES, CHAIR

June 30, 2026

AHMET PALAZOGLU
CHAIR, ACADEMIC COUNCIL

RE: UCRP Assumed Rate of Return

Dear Chair Palazoglu,

The actuarial rate of return for UC pension accounting determines the level of employee/employer contributions needed to follow a path to restore the Plan to 100% funded status. The path is based on a set of actuarial assumptions, including the assumed rate of return, and is accurate to the extent that the actuarial assumptions themselves turn out to be correct. The lower the assumed rate of return used in these calculations, the higher contributions need to be for the Plan to reach full funding at a given point in the future. Higher contributions have a substantial opportunity cost, especially in tight budgetary times.

UCFW's Task Force on Investments and Retirement (TFIR) finds that the current 6.75% assumption is too low, given the mix of assets in which UCRP funds are invested and the anticipated returns on these assets. TFIR thus recommends an increase in the assumed rate of return to at least 7.25%. Such a change would have the effect of immediately restating the Plan's funded status, lowering the actuarial liability, and reducing the portion by which the Plan is considered unfunded. These changes, in turn, would make planned increases in the employer contribution percentage unnecessary, and would support reducing current high levels of employer/employee contributions. Such reductions improve both the operating budget of the University and the competitiveness of UC's total remuneration to employees.

The savings that would occur simply from not imposing the planned increase in the employer contribution rate would be on the order of $600M

annually. TFIR's estimates suggest that the total savings would be at least twice that amount once contributions are reduced from their current high levels, which the proposed higher rate of return would justify. TFIR has modeled a simple portfolio that resembles the Blue and Gold fund and which mimics the mean-variance characteristics of UCRP investments. The results of these simulations are very encouraging concerning the sustainability of the Plan under this proposal.

UCFW members discussed this proposal and concur with TFIR's recommendation, and request that the Academic Council approve this recommendation and convey it to the administration.

Sincerely,

Karen Bales, UCFW Chair

Cc: Academic Council Vice Chair Susannah Scott
Senate Executive Director Monica Lin
UCFW Members
TFIR Members

June 30, 2026

To: Karen Bales, UCFW Chair

From: Jill Hollenbach, TFIR Chair[1]

Re: TFIR's Recommendation to Increase the Actuarial Rate of Return for the University of California Retirement Plan (UCRP)

Executive Summary

TFIR has analyzed the financial status of the UC Pension system and concluded that the assumed (or actuarial) rate of return should be increased from 6.75% to 7.25%. The analysis has several components with key results:

- We reviewed UC Pension accounts and net cash flows from 2012 – 2025. We found that funding ratios are improving and drawdowns from UC pension assets are small and stable.
- A portfolio similar to the UC Blue and Gold endowment closely matches UC Pension returns and volatility over 1992 – 2025. Annualized returns[2] equal to 8.94% over the years 1928 – 2025 show that the current 6.75% assumed rate of return is quite low.
- In our simulations, we make the conservative assumption that contributions to UCRP and benefit payments will fully keep up with inflation. We also assume that Regents will act to keep the funding ratio between 80% and 120% (it is currently about 90%)
- We show that real returns from 1928 – 2025 are stable, and use these to simulate 2000 98-year real returns series. For each of these 2000 simulated returns we compute the trajectory of UC Pension assets as well as transfer payments required to keep the funding ratio in the assumed range.
- The simulations show that if the assumed rate of return is increased to 7.25% then contributions could be reduced by at least $680 million per year (in constant dollars) without increasing the risk of needing additional transfers relative to the current status quo. If the investment portfolio is changed to increase equities from 60% to 80%, then

[1] TFIR has discussed and approved the contents of this memo, but any errors or omissions are the fault of the authors: David Brownstone and Jim Chalfant. They welcome comments and suggestions for improvements. They will also provide the spreadsheets with the data and computations – email dbrownst@uci.edu.

[2] The annualized return is the geometric average of the annual returns over the time period. It can be interpreted as the constant rate of return that when compounded over the period yields the same final value as the original series of returns.

contributions could be reduced by at least $1.7 billion per year with only modest increases in risk.

- We review scenarios based on UC financial statements to develop alternative estimates of annual cost savings, finding that they would be at least $1.4 billion, lending additional support to the similar results from the simulations.

1. The relationship between the assumed rate of return and the level of contributions

Before presenting the evidence to support our recommendation, we need to clarify a few aspects of UC pension accounting. The pension fund should not be thought of as a 401(k) plan, with a balance built up to support retirement that will be spent down over time. A better analogy is to the water in a reservoir or pond which, with suitable management, represents a resource with an unlimited time horizon, one that is conceptually infinite. For a pension fund, suitable management includes contributing funds to the Plan and investing the funds. There is an obvious trade-off in that higher earnings support fewer contributions and vice-versa. Of course, investing for higher earnings involves accepting more risk. The size of the fund is generally summarized by the Market Value of Assets (MVA) and its funded status is based on comparing MVA to a measure of pension obligations, the Actuarial Accrued Liability (AAL). The AAL represents the present discounted value of all future pensions that the Plan is expected to pay, earned by service to date by both retirees and active employees, if all actuarial assumptions concerning salaries, retirement behavior, mortality, and more turn out to be correct. The Plan's funded status is the ratio of MVA to AAL, expressed as a percentage. Actuaries routinely report the Plan's value using a moving average, the Actuarial Value of Assets (AVA). The difference between AVA and AAL is called the Unfunded Actuarial Accrued Liability (UAAL). Expressing UAAL as MVA minus AAL is also common, and the definition we use.

Among the set of actuarial assumptions is the actuarial rate of return, the assumed rate of return from investing the assets in the Plan. The actuarial rate of return is recommended by consulting actuaries, based on the asset allocation policies The Regents have chosen. In common parlance, this rate is sometimes called the assumed rate of return, as we have called it, or alternatively, the expected return, but it is important to note that it is not, in fact, an expected value in the formal statistical sense. There is a provision for risk built into the choice of rate, and expected returns are actually higher than 6.75%.

Two more points are needed. The first is to define the Policy Contribution Rate (PCR). The PCR is the recommended level of contributions (from both the employer and employees), expressed

as a percentage of payroll, that ensure that the Plan receives sufficient funding to cover the additional pension liability created by the current year's service of active employees (i.e., the Plan's Normal Cost) as well as the amortization of a portion of its unfunded liability. That portion is set by the Plan's amortization policy and the precise details need not concern us here.[3] The PCR is a benchmark, not a required level of funding, and it is a function of the actuarial rate of return. Separate actions by the Regents each year set the levels of employer and employee contributions, respectively. The PCR serves as an important benchmark: contributing at that rate keeps the Plan on a path to being 100% funded, while falling short delays full funding. Both of those amounts—the normal cost and the amortization—are inversely related to the assumed, or actuarial, rate of return. Contributing less than the PCR in a given year is analogous to earning returns below the actuarial rate; both cause increases in the PCR in future years, to amortize the shortfalls in earnings.

The second clarification we make is simply to note that changing the *assumed* rate of return does not change the *actual* return on investments; actual returns to the UCRP investment portfolio follow from the asset allocation policy set by The Regents and the returns those assets produce. Actuaries do not try to predict year-to-year variation in rates of return. Instead, the assumed rate is used to model future outcomes such as progress toward 100% funding and thus make decisions about current funding strategies.

However, increasing the assumed rate of return does have two important immediate effects. First, the actuarial accrued liability (AAL) is reduced. The AAL is the present discounted value of the future liabilities (i.e. pension payments) that UC expects to provide, based on current actuarial assumptions. Discounting those anticipated future expenditures to current dollars using a higher rate of return means a smaller present value. If the AAL is reduced, so is the difference between the current value of assets and the AAL. As noted earlier, this difference is the unfunded pension liability or UAAL. With a smaller unfunded liability, the amortization required each year to achieve 100% funding is also reduced.

The other component of the PCR is *Normal Cost*. As noted above, Normal Cost is the present value of pension payments earned from the current year of service by active employees. For the same reason as the AAL, Normal Cost is reduced as the assumed rate of return increases—

[3] Briefly, any surplus or shortfall in annual earnings compared to the assumed rate of return is recognized over five years, via actuarial smoothing of returns, and then the surplus or shortfall is spread, or amortized, over 20 years. The long timelines are intended to minimize volatility in contributions while still keeping the Plan on a path to full funding.

less funding is needed now to provide for these future pension payments if the funds are expected to earn a higher return.

Whatever the assumed rate of return, more contributions are preferred to less from the standpoint of the Plan's funded status. Employer and employee contributions have an opportunity cost, however, and there are good reasons why contributions remain below the PCR that is based on the 6.75% assumption. Higher employee contributions reduce the competitiveness of total remuneration. Higher employer contributions constrain the operating budget. TFIR members do not think it is fiscally responsible to consistently avoid following the Regents funding policy. At the same time, these opportunity costs make it important to ensure that UC is not contributing more than necessary. Our calculations suggest that the current levels of contributions are more than sufficient and planned increases in the employer contribution are not needed. In fact, contributions could be reduced from their current level if our proposal is adopted.

2. Recent History of UC pension funding and cash flows

In the analysis below, we suggest two criteria to evaluate our proposed increase in the actuarial rate of return, from 6.75% to 7.25%. The first, the Plan's funding ratio (MVA/AAL), is the more familiar. We will also make use of a cash-flow analysis, motivated by the analogy to a pond. As we noted, the pension fund should not be thought of as a 401(k) plan, with a balance at retirement that will be spent down over time. Think instead of the pension fund as a reservoir or perhaps an on-farm pond used for irrigating crops, where the long-term level of water available depends on inflows (e.g. purchasing from a public utility) and growth (e.g. the combined effects of rainfall and evaporation or other losses) sufficient to sustain a predictable level of withdrawals. Pension assets are represented by the amount of water in the pond. There is some randomness in the need for withdrawals, i.e., irrigation of crops, but probably less than the randomness in the growth due to rainfall and decline due to evaporation. To align more closely with UCRP, let us assume that the pond cannot be sustained solely by rainfall, and typically will also need inflows such as the purchase of water. Let's imagine that these purchases are cheaper than pumping water from the pond but limited to a certain amount. Given that, how often can irrigation needs be met with water purchases alone, and is there any possibility of depleting the pond?

The analogy seems very apt: annual pension payments to retirees are like the withdrawals from the pond for irrigation; the net effect of rainfall and evaporation represents annual returns

from the assets in the plan and thus negative returns are possible and there is likely significant variability over time; purchased water represents contributions—they cost money but improve the ability of the pond to meet obligations.

To take the analogy further, administrative costs might be thought of as a small but predictable loss or outflow due to leakage. The counterpart to market volatility is variability in weather, expected or long-term average climate patterns are the counterpart to actuarial assumptions, and insolvency risk is represented by the possibility that the pond runs out of water.

One way to characterize the sustainability of irrigated production is to focus on the level of water in the pond. Another is to find the probability that a given level of annual irrigation flows and water purchases would be sufficient to never deplete the pond (i.e. never run out of money to pay the pensions of existing retirees).

UCRP's contribution holiday (from 1990 – 2010) can be expressed as the natural response to a series of El Niño years—so much rainfall that there was no reason to purchase water to add to the pond. When the rainy years ended, the response was a combination of drawing down water level in the pond and beginning to purchase water.

The Regents have concentrated on the size of the unfunded pension liability and the size of the assets held by the pension system, the latter of which is like focusing on the level of the pond—not particularly helpful by itself for determining additional water needs without some understanding of the expected future rainfall and expected future irrigation needs. In the context of the analogy, the unfunded liability might be expressed by comparing the current level of water in the pond to planned irrigation in future years, when the current level is insufficient and additional inflows will be needed. As the above analogy shows, it is also important to focus on the flows in and out of the pension system. The remainder of this memo shows that under conservative assumptions about future liabilities and investment returns, even with no other increase in inflows, there is little risk of the pension system failing and being unable to meet future obligations, using our simple portfolio and a 7.25% assumption.

Turning away from our farm and back to UCRP, we have compiled time-series data on a set of key variables dating back to before 2010, when the twenty-year contribution holiday ended.[4] For each year, we calculated a measure of asset exposure, or drawdowns, to indicate whether or not pension benefits and administrative costs could be paid solely with incoming

[4] In later simulations we go far further back in time to analyze investment returns.

contributions, or whether there was a need to sell some assets. One version of our calculation used income to the plan as the sum of employer and employee contributions, plus any transfers from STIP.[5] However, the Regents rescinded their plan to transfer funds from STIP this year, repeating an action they took last year. As a result, we base our analysis on funding absent any STIP transfers. We calculated the difference between funds coming to the Plan and funds going out as the sum of employee and employer contributions, minus administrative expenses, minus benefits paid in the same year.

Expressing the difference as the drawdown of assets required to meet obligations, a positive number requires selling some assets (or drawing on cash held in the Plan) and negative values represent new funds that can be invested. As a percentage of the market value of assets in the same year, we observed only two instances where the need to sell assets exceeded 2.5% of the value of the portfolio. That was the case for 2012 and 2013, years where without transfers, the sum of employer and employee contributions would have fallen short of full normal cost. After 2014, the sum of employee and employer contributions net of transfers has always exceeded normal cost, and the percentage of assets withdrawn from the Plan has not exceeded 1.5%. There is of course no direct link between contributions to cover normal cost and benefit payments linked to historical service, only cash-flow considerations, but the more recent years better reflect the relative sizes of income and expenditures for the Plan. See Appendix 1 for full details.

3. **Predicting investment returns under uncertainty**

We begin by looking at very long-run investment returns to show that the current assumed rate of return of 6.75% is quite conservative. The remainder of this section shows that, under plausible assumptions about the uncertainty of investment returns, adopting our recommendation would support reducing contributions while still making it extremely likely that the Plan will remain solvent. Equally important, this occurs under a policy of fixing the real value of contributions and benefits at their 2025 levels. In actuality, the Regents Funding Policy calls for adjusting contributions after any shortfalls in earnings, to keep the Plan on a path to 100% funded status. It should be kept in mind that this Policy represents guidance but is not followed to the letter, and current contributions fall short of this level. Hence, we consider various alternatives to approximate such a policy at the end of this section.

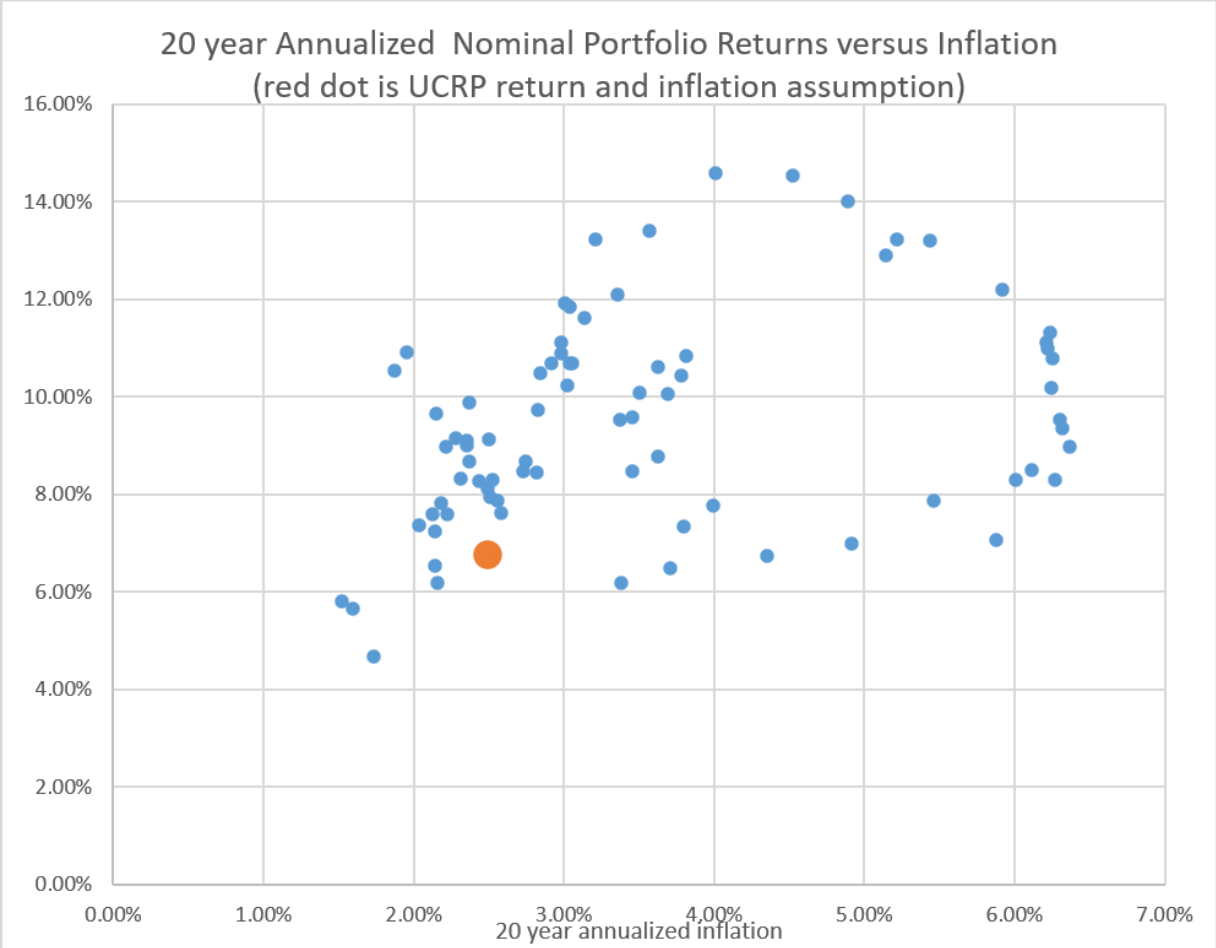
[5] Since 2011, transfers of funds from the UC Short-Term Interest Pool (STIP) or from external borrowing have supplemented scheduled employer and employee contributions to the plan and have totaled just over $8 billion. These transfers are treated as loans to the campuses and are repaid with payroll assessments.

The current UCRP investment portfolio contains about 25% “alternative investments.” These investments include venture capital and hedge funds that are difficult to value. However, a simple US index portfolio (60% US equities value-weighted index, 13% 3-Month T-bills, 27% BAA corporate bonds) closely matches UC Pension Investments over the 1992 – 2025 period for which we could find UC investment return data. Table 1 below shows that the annualized returns from this portfolio (8.96%) are greater than the 8.77% earned by UC Pension Investments, with a difference of 0.19%, and the volatility of this index portfolio (as measured by the standard deviation of the annual returns) is essentially the same. Although 0.19% may seem small, when realized year after year, it translates to a large amount. Note that the annualized rates of return on both the index portfolio and UC Pension Investments are at least 2 percentage points above the assumed 6.75%. It is therefore easy to exceed the 6.75% target, and in fact easy to exceed our proposed 7.25% targets.

Table 1: Nominal Returns and Inflation

	Index Portfolio	UCRP	Inflation
Average 1992-2025	9.58%	9.38%	
Standard Deviation 1992-2025	11.23%	11.24%	
Annualized 1992-2025 return	8.96%	8.77%	2.54%
Annualized 1928 - 2025 return	8.94%		3.03%
Annualized 1945 -2025 return	9.68%		3.65%
Annualized 2010-2025 return	9.86%	9.72%	2.57%

The following chart plots 20-year annualized nominal returns from the index portfolio against 20-year annualized inflation for each year starting in 1928 and ending in 2006. This provides further visual evidence that the current assumed 6.75% investment return rate is very conservative.



The chart above shows considerable variability in 20-year annualized investment returns and in inflation. It is critical to investigate the impact of this uncertainty on the ability of the UC pension system to pay its promised benefits over many years. The Segal Group, the actuarial consultants employed by UC, models this variability by assuming a fixed inflation rate and assumes that the returns to the individual asset classes follow a multivariate normal distribution. This methodology ignores the uncertainty inherent in predicting inflation. It turns out that it is very difficult to find a tractable joint model of inflation and investment returns. A better approach is to model the uncertainty in real investment returns. Real returns for the index portfolio and UCRP are summarized below:

Table 2: Real Returns

	Index Portfolio	UCRP
Average 1992-2025	6.87%	6.65%
Standard Deviation 1992-2025	11.07%	10.74%
Annualized 1992-2025 return	6.25%	6.08%
Annualized 1928 - 2025 return	5.73%	
Annualized 1945 -2025 return	5.82%	
Annualized 2010-2025 return	7.11%	6.35%

Note that the 6.75% nominal return/ 2.5% inflation assumptions correspond to a 4.15% real return and 7.25% nominal return/ 2.5% inflation corresponds to 4.63% real return

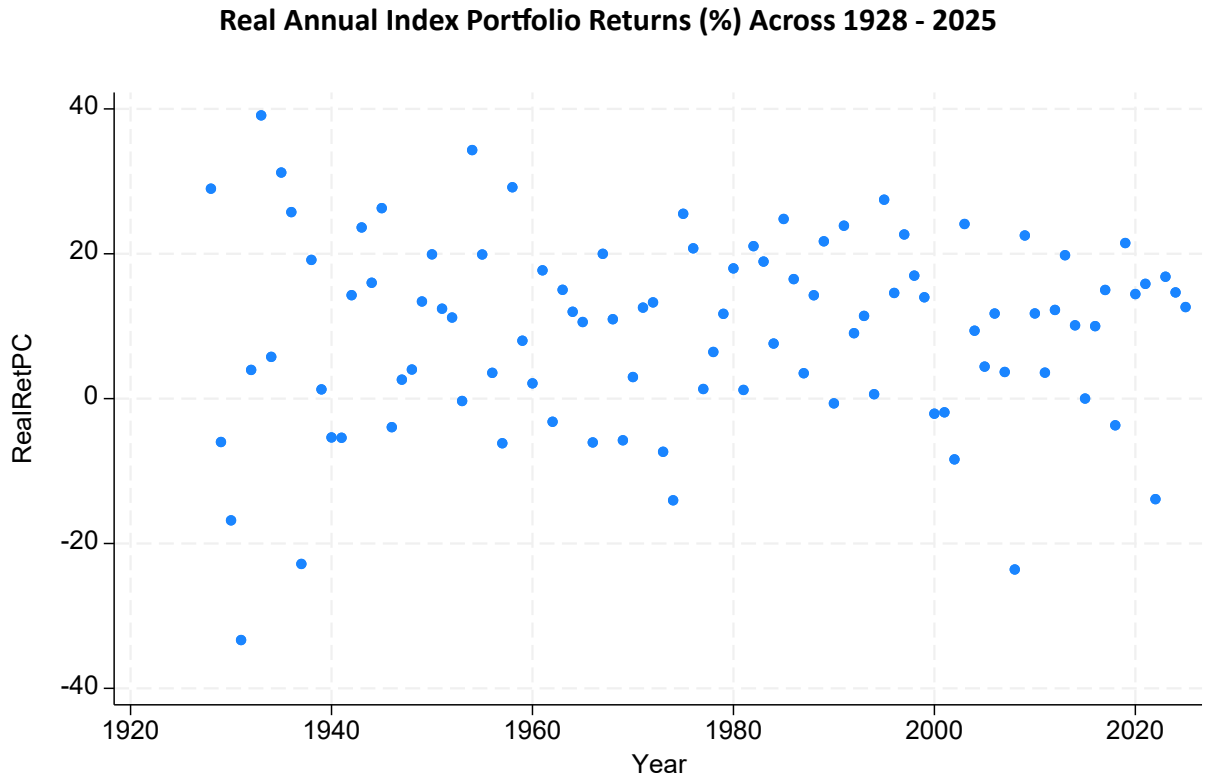
From the previous section of this memo, we know that the withdrawals from UC Pension assets are currently fairly stable and currently below 1.5% per year. We will use a flexible robust model of uncertainty in real investment returns to simulate what happens if 1.5% of the initial assets are withdrawn each year. Since it is unlikely that growth in UC employee count and payroll (due largely to recent hospital acquisitions) will continue at recent rates, we will assume that payroll amounts and benefit payments will remain constant in real dollar terms. This corresponds to assuming that pay and benefits will fully keep up with inflation, but our results do not rely on an ever-expanding real payroll to sustain the Plan at this level. Because the UCRP cost of living adjustments are below the rate of inflation whenever inflation is higher than 2%, the assumption that real benefits remain constant is conservative. In reality, inflation at 2.5% erodes the real value of pension benefits due to UCRP's imperfect COLA protection. When we simulate this 1.5% real withdrawal rate over the actual data from 1928 – 2025, we find that the real value of pension assets increases by a factor of more than 170, so our proposal is certainly consistent with the pattern of historical returns.

Keep in mind that the 1.5% is an empirical regularity in recent years, not the result of individuals choosing the rate at which they will draw down a balance. These payments are based on benefits formulas, not discretionary withdrawals, so there is little risk of a substantial increase in the amount of drawdown, only earnings risk for the assets in the Plan.

To make our calculations more realistic we further assume that whenever the value of the pension assets (MVA) falls below the 80% funding ratio then the Regents will take action (increasing contributions or STIP transfers) to keep it from falling further. Similarly we assume that if the MVA rises above 120% funding ratio the Regents will take action to keep it from rising further. Recall that the last time this happened (1990) the Regents suspended both employer and employee contributions. To avoid assuming exactly what actions the Regents will take in these scenarios, we will simply keep track of the implied transfers. For example, if the funding ratio rises to 130% we will deduct the amount required to bring the funding ratio back to 120%

and add that amount to the transfer account. If the funding ratio falls below 80% then we will add funds to get back to 80% and subtract those funds from the transfer account. The present value of these transfers can be interpreted as the net surplus accumulating in the Plan (or additional contributions the Regents will need to make, if negative) over the relevant horizon. When we simulate this strategy for the 1992 – 2025 period (assuming the 2025 values of $110.7 Billion MVA and $12.3 Billion AAL) we find that the present value of the transfers is $86 billion and there were no years where there were negative transfers. Of course, the next 34 years is not likely to be identical to the 1992 – 2025 period. We will therefore extend our time frame back to 1928.

We have data on the real return earned by our index portfolio from 1928 and through 2025. Efficient market theory predicts that these real returns will not have any correlations over time because otherwise an investor could make money by exploiting these correlations. The historical data do not show any correlations; they do not reject the hypothesis that all time correlations are zero using standard econometric tests. The chart below shows the real portfolio returns, and it shows no evidence that the patterns of returns is changing over time. We will therefore assume that future real returns are random draws from the same distribution that resulted in the observed returns below.



Instead of assuming that real returns follow a particular probability distribution like Normal or Skew-Normal, we use a block bootstrap technique to model a wide range of possible outcomes using 2000 replications; in other words, 2000 possible 98-year trajectories for the real return earned by our index portfolio. [6] To implement the bootstrap technique, we split the 98 years of data into 49 blocks of 2 contiguous years.[7] We then randomly sample these blocks with replacement and assemble a new 98 years of data. Using these new 98 years of real returns we simulate the pension management strategy previously described above. We repeat this process 2000 times with the results summarized below:

[6] This method provides consistent estimates even if there are some correlations over time or if the variances of the returns vary over time and does not require any assumptions about the shape of the underlying distribution. We get essentially the same results if the annual returns are drawn independently from a normal distribution with mean and variance equal to the estimated values over the 1928 – 2025 period.

[7] We tested for the presence of autoregressive heteroskedasticity using an ARCH model and only found weak evidence for a one-year lag effect on the conditional variance.

Table 3: Simulated Real Returns and Required Asset Transfers Starting From 2025 UCRP

	30 yr Annualized return	30 yr Transfer PV	60 yr Annualized return	60 yr Transfer PV	30 yr Min 10-yr smoothed transfer	60 yr Min 10-yr smoothed transfer	98 yr Annualized return
Average	5.67%	$72	5.73%	$106	-$1	-$2	5.72%
Std. Deviation	2.32%	$50	1.67%	$54	$3	$2	1.31%
median	5.69%	$70	5.78%	$105	-$1	-$1	5.73%
25th Percentile	4.12%	$38	4.63%	$69	-$2	-$3	4.86%
10th Percentile	2.69%	$8	3.44%	$39	-$4	-$4	4.07%
5th Percentile	1.71%	-$6	2.85%	$19	-$5	-$6	3.51%
% returns > 4.15%	75%		83%				
% returns > 4.63%	68%		75%				

Note that the 6.75% nominal return/ 2.5% inflation assumptions correspond to a 4.15% real return and 7.25% nominal return/ 2.5% inflation corresponds to 4.63% real return

As expected, the longer the time period, the lower the variability of the annualized returns. The present value of the transfers required to keep the funding ratio between 80% to 120% is positive about 95% of the time, with a median value of $70 Billion. This represents substantial potential savings to UC and employees. To incorporate something like the amortization of earnings shortfalls or surpluses, we spread each year's transfer sum over ten subsequent years, in level dollar amounts. The "30-yr Min 10-yr smoothed transfer sum" and "60 year Min 10-yr smoothed transfer sum" columns show the minimum of the 10-year lagged moving average of the transfer balances over each simulation. These represent the worst annual outcomes assuming the Regents have access to funds (for example STIP) that could smooth over 10 years of required transfers to pension assets.

Table 3 also reports the percentage of simulated 30- and 60-year annualized real investment returns that exceed the current 6.75% and proposed 7.25% assumed rates of return. These are comparable to Segal's reported "confidence levels", but they are much larger than the 56% from the last Segal Experience study.[8] Segal's confidence levels are calculated assuming a fixed rate of inflation (2.5%) and a Normal distribution for nominal investment returns. The results in

[8] Segal's specific calculation was to find the probability that the simple average of the annual rates of return over 15 years would exceed 6.75%. When we simulate the annualized real 15-year returns we find that 68% are greater than 4.15% and 62% are greater than 4.63%

Table 3 account for varying inflation over a 98-year period, do not assume a Normal distribution, and do not depend on any estimated parameters. Segal recommends that the "confidence level" be at least 50%. The probability that 30-year annualized returns exceed the proposed 7.25% is 68%, and this supports our proposal to increase the assumed rate of return to at least 7.25%. The key change to our simulations in Table 3 is to remove the $12.3 Billion unfunded liability[9]. The results of simulating this change are in the first two columns of Table 4.

Table 4: Simulated Required Asset Transfers Starting From 2025 UCRP Assuming a 7.25% nominal rate of return

	With 1.5% drawdown as in Table 3		With an additional $680 million/year real drawdown	
	30 yr Transfer PV	30 yr Min 10-yr smoothed transfer	30 yr Transfer PV	30 yr Min 10-yr smoothed transfer
Average	$85	$0	$74	$0
Std. Deviation	$47	$3	$46	$3
median	$83	$0	$72	$0
25th Percentile	$53	-$1	$42	-$2
10th Percentile	$26	-$3	$15	-$3
5th Percentile	$12	-$4	$2	-$5

Note that the present value of the transfers required to keep the funding ratio in the 80% - 120% range increases by $13 Billion with no increase in the probability or costs (in terms of larger negative transfer sums) relative to the current assumptions simulated in Table 3. The last two columns of Table 4 show what happens if contributions are reduced by $680 million[10] per year. The results are very similar to the relevant columns in Table 3, and this shows that by increasing the assumed rate of return to 7.25% annual pension contributions can be reduced without increasing the risk of negative transfers relative to the current assumptions modeled in Table 3.

[9] Based on conversations with John Monroe, the Chief Actuary of UC, we assume that the unfunded liability would be negligible upon adopting our proposal. The AAL declines substantially, hence there is less of it that is unfunded, using either the market value of assets or the actuarial value, since those two measures are unaffected.
[10] This figure was chosen by trial and error to closely match the transfer number distributions in Table 3.

Conversations with UC's Chief Investment Officer suggest that if the Regents adopt our proposal to increase the assumed rate of return to 7.25% then the investment portfolio will shift to take on more risk. Our results suggest that this is not needed, but they also suggest that the Plan could safely take on more risk. To model this possibility, we changed the portfolio to 80% US equities, 10% Treasury bills, and 10% BAA Corporate bonds. The results are given in Table 5, and Table 6 shows the distribution of simulated transfers with and without an additional $1.7 Billion reduction in contributions. The last two columns of Table 6 (copied from Table 3) show that increasing the rate of return to 7.25%, shifting to an 80% equity portfolio, and decreasing annual contributions by $1.7 billion results in very similar outcomes to the current situation simulated in Table 3.

Table 5: Simulated Real Returns with an 80% equity portfolio

	30 yr Annualized return	60 yr Annualized return	98 yr Annualized return
Average	6.37%	6.43%	6.43%
Std. Deviation	2.88%	2.07%	1.63%
median	6.43%	6.52%	6.45%
25th Percentile	4.47%	5.07%	5.32%
10th Percentile	2.64%	3.60%	4.33%
5th Percentile	1.41%	2.88%	3.61%
% returns > 4.15%	78%	86%	
% returns > 4.63%	73%	81%	

This change increases the median 30-year annualized real return by 0.74% and the median present value of the transfers by $34 Billion. The probability that 30-year annualized returns exceed 7.25% increases by 5% to 73%. However, the likelihood and magnitude of bad outcomes increase slightly due to the somewhat riskier portfolio. This behavior is predicted by efficient market theory – any increase in return from one efficient portfolio to another must be accompanied by an increase in volatility.

Table 6: Simulated Required Asset Transfers Starting From 2025 UCRP Assuming a 7.25% nominal rate of return with an 80% equity portfolio

	With 1.5% drawdown as in Table 3		With an additional $1.7 billion/year real drawdown		With current 6.75% assumptions and portfolio from Table 3	
	30 yr Transfer PV	30 yr Min 10-yr smoothed transfer	30 yr Transfer PV	30 yr Min 10-yr smoothed transfer	30 yr Transfer PV	30 yr Min 10-yr smoothed transfer
Average	$105	$0	$78	-$2	$72	-$1
Std. Deviation	$58	$3	$57	$3	$50	$3
median	$104	$0	$76	-$1	$70	-$1
25th Percentile	$66	-$2	$39	-$4	$38	-$2
10th Percentile	$32	-$4	$6	-$6	$8	-$4
5th Percentile	$14	-$6	-$11	-$7	-$6	-$5

As we emphasized earlier, the take-away message here should not be that we are proposing a policy that has some likelihood of insolvency. The Regents would need to take action to increase contributions in such cases, under our proposal or under the status quo. The important point is that these cases occur very infrequently under our proposal, while substantial savings are created for the campuses' operating budgets.

The current employer contributions plus STIP transfers to UCRP are approximately 9% of annual UC expenditures, and they will increase over the next few years, as UC implements increases in the employer contribution rate previously approved by The Regents. Increasing the assumed rate of return will allow significant reductions in these expenditures, allowing UC to devote more resources to its core research and teaching missions, with little increase in risk. Our conservative estimates from Tables 4 and 6 show that annual contributions to the UC pension could be reduced by $.68 - $1.7 billion. These savings could make a substantial contribution to our core missions.

4. **What if we are wrong?**

Our proposal concludes with a discussion of two different aspects of potential adverse effects. We consider separately the effects on contributions to UCRP and the effects on investments.

Contributions and Funding Policy

Especially considering planned increases in contributions to the pension plan, TFIR believes that contributions are too high. They are a burden for funding sources and when considering total renumeration, they harm our competitiveness both in terms of hiring and retaining faculty and staff, but also when competing for contracts and grants. Contributing/saving too much is easily portrayed as being more prudent than necessary, but many might fail to see the harm in this cautious approach. The opportunity costs associated with this prudence are high, as we have noted, and contributing more than necessary now is in effect an intergenerational transfer that harms the current generation. The higher contributions now, and the earnings that follow, make it possible for contributions to be lowered in the future, assuming the Plan performs according to the actuarial assumptions. UC can set the contributions pattern however it would like, over time, but it must be acknowledged that what we view as excess contributions come at the expense of the operating budget, and therefore at the expense of students and all those who benefits from UC's ability to fulfill its mission.

Outside funding sources should pay an appropriate amount towards the benefits of those employed through these sources. Charging them too little leaves UC responsible for covering pension benefits, but overcharging them harms our competitiveness for obtaining those funds. For employees who depend on contracts and grants or clinical revenues, excess contributions do direct harm because they constrain other parts of the budget.

Our calculations suggest that there would be a much smaller unfunded liability if our proposal were to be adopted. Based on our recommended assumed rate of return, current contribution levels would be above what is needed and could be reduced. Even if they were held constant, the planned *increases* in the employer contribution (totaling 3% of payroll) could be avoided. With a nearly $20B payroll at present, that alone represents annual savings of at least $600 million. Approximately one-third of this amount represents savings to core funds, and the rest is saved by outside funding sources. Contribution levels already approved by the Regents will continue to exceed normal cost because they already exceed the normal cost figured derived from 6.75%. They are clearly sufficient if normal cost is reduced.

Holding investment patterns constant, how might our proposed change turn out poorly? It would depend on the extent to which The Regents reduce contributions to the Plan. Supposing they do nothing but rescind planned increases, UC would continue to contribute above Normal Cost each year, and the only consequence from average or long-term returns not being sufficient to justify the 7.25% assumption would be slower progress to 100% funded status. As the Plan is currently over 90% funded, this does not seem like a significant risk.[11]

Further reductions, for instance to reduce employer/employee contributions to just meet Normal Cost, would be justified if the new actuarial rate reduces the unfunded liability to near zero, as we predict would occur. To keep the Plan fully funded, The Regents would merely need to follow their own funding policy, increasing contributions when there are shortfalls in earnings and reducing them when earnings outperform the benchmark.

This focus on funding policy provides a sequel to our proposal and does not require a new funding policy. The Regents funding policy (Regents Policy 5601) described earlier calls for 20-year amortization of any deficit. A fully funded plan that follows 1-year amortization and earns a surplus would reduce contributions in the next year by the amount of the surplus; the volatility in contribution rates that this would create make planning and budgeting difficult. Conversely, the longer the amortization period, the less is the effect of a surplus or shortfall on the Policy Contribution Rate. Any instances where earnings fall short of 7.25% would be made up for automatically. For some additional perspective, for each percentage point below the actuarial rate, a shortfall of around $1.1B is created. Ignoring the gradual recognition of a loss of that size over five years, the 20-year amortization means contributions of 1/20th of $1.1B or around $55M are needed each year. With the current payroll of nearly $20B, that would require additional employer contributions equal to 0.27% of payroll, a minor increase relative to the current 15% employer contribution.[12] Hypothetically, suppose the Plan earns exactly 6.75% every year, while contributions are based on our 7.25% recommendation (ignoring contributions above Normal Cost). Eventually, contributions would need to increase by 20 times

[11] Skeptics should keep in mind, also, that the AAL is vastly larger than one year's benefit payments. The AAL was $123B on July 1, 2025. The MVA was $110.7B on the same date. Annual benefits payments for 2024-25 were just over $5.5B, not even 5% of the AAL and just about exactly 5% of the MVA. This reflects the fact that the AAL pertains to all future pension obligations accruing to service already accumulated, even payments expected to be made decades from now, to employees who are currently many years away from retirement. There should be no concern about the Plan becoming insolvent because of an increase from 6.75% to 7.25%.

[12] In the previous draft of this document, we did not emphasize that it is employer contributions, not employee contributions, that are adjusted based on earnings surpluses or shortfalls. The employee pays a share of Normal Cost but none of the amortization costs. We thank Robert Brosnan for commenting that it is more difficult to adjust the employee contribution percentage; we agree and feel that this point is worth emphasizing.

one-half of the 0.27% figure, or roughly 2.7%. This percentage is less than the current contributions above Normal Cost and also less than the additional employer contributions already approved by The Regents.

But a funding policy offers little protection if it's not followed. A conservative actuarial rate of return might be construed as fiscally prudent, but if it is combined with practice to routinely fall short of the PCR, it is nothing of the sort. Only contributions and earnings that are actually realized matter for the health of the Plan, regardless of any actuarial rate of return. A conservative assumption strengthens the Plan only if the contributions made reflect that assumption.

Given that view, why do we care? The PCR is easier to contribute when it is based on a more reasonable actuarial rate of return, and the discipline that it provides is all the protection that the University needs against any imagined harm that might be expected from assuming a higher rate of return. If earnings fall short, then the PCR will include an amortization charge to make up for the shortfall. TFIR favors following the policy over adhering to a schedule for increasing contributions (by a full 3% for the employer contribution over the next six years) that was set several years ago, remaining the same despite changes in the Plan's funded status. Thus, a key aspect of our recommendation to increase the actuarial rate of return is to use it as intended—not to guide how UC invests, but by following the Regents Funding Policy.

Investments

Our analysis above did not account for any change in investment strategy. Suppose The Regents favored taking on more risk to increase the probability of achieving a 7.25% return.[13] Our simulations summarized in Table 5 show that such a change would also be increasing the probability of achieving 6.75%, of course. The simulations also provide support for the view that little additional risk need be absorbed, but the cash-flow analysis suggests that it could indeed be absorbed. It would mean investing the assets in the Plan in a manner somewhat more like Blue and Gold, which TFIR supports. We argued above that the Funding Policy is of little value if it is not followed. TFIR would welcome a coherent reconciliation of funding policies, investment

[13] It's entirely possible that will be the response, but in reality, this has already occurred. In the Experience Study where the 6.75% rate was modeled, the portfolio was assumed to be 53% in equities. The Regents benchmark for equities now is 57%, and the Plan's assets are 8% over-weighted in equities, relative to that higher benchmark. A total of 12% higher weight indicates that rather than needing to take on more risk when 7.25% is assumed, the Plan has already taken on the higher risk, seeking higher returns, and the assumed rate of return ought to reflect that reallocation.

strategies, and planned contributions that considers not only UCRP, but STIP, Blue and Gold, and TRIP. We expect critics of our proposal to say that not doing everything we can to close the unfunded liability represents borrowing at a cost equal to the actuarial rate of return, an argument TFIR has often made in the past. The campuses clearly consider that to be a good idea, since the unfunded liability grows at the actuarial rate of interest each year; they are in effect borrowing at the actuarial rate in order to protect not just the operating budget, but investments they expect to earn more from (in Blue and Gold and the Total Returns Investment Pool). The only justification for a pension plan being more conservative than the General Endowment Pool (GEP) or these other funds is the need to make pension payments, and our cash-flow analysis shows that this concern is significantly overstated. There is no other reason why UC should be more risk averse when managing investments of UCRP's assets than those in other long-term funds. If UCRP assets are invested to take on more risk, following the adoption of our proposal, it should be because The Regents agree with that strategy. Our proposal neither depends on that change nor forces it to occur.

5. Estimated Cost Savings

It is common to link changes in the actuarial rate of return to changes in AAL or the unfunded portion. Here, we describe a further step, translating those changes into direct cost savings. In 2019, Normal Cost increased from 17.9% to 20.9% of payroll. The reduction in the actuarial rate of return to 6.75% from 7.25% was not solely responsible, but it was the most significant of changes in assumptions that year. Let's say that half the difference was due to the change in the rate, and would work the same in reverse. Then Normal Cost will decline by (at least) 1.5%, from its current 19.96%, to 18.46%, if the actuarial rate is returned to 7.25%. That 1.5% reduction applied to a $19.2B payroll represents $288M annual savings.

Also, from the University's own financial statements (see p. 92), estimates of the sensitivity of the unfunded liability to the actuarial rate show the following values: an estimated $28.9B for 5.75%, the actual current estimate of $12.2B (using the market value of assets) for 6.75%, and an estimated surplus of $1.56B for 7.75%. The relationship is not exactly linear, but interpolating yields $5.3B for 7.25%.

The amortization cost in the November 2025 valuation was 10.4% of payroll. This amount is added to Normal Cost to define the Policy Contribution Rate. Assuming it reduces proportionally, we can rescale the amortization cost by the ratio of the new unfunded liability to the old one, i.e. 5.3/12.2. Multiplying this ratio by 10.4% yields 4.7%, a reduction of 5.7%.

We will have thus reduced the Policy Contribution Rate by a total of over seven percentage points (7.2%), or around $1.4B annually.

One might note that these savings are not new, if UC already is saving by not following the Regents Funding Policy and instead is contributing less than the Policy Contribution Rate. However, a portion of the unfunded liability not paid down this year grows in value at the actuarial rate; simply not following the policy does not save, it instead creates an additional liability next year that is higher by the current 6.75%. It is simply liability that has to be paid down in the future. Thus, our estimate does represent true cost savings from changing the assumed rate of return.

APPENDIX 1 : Recent Data and Calculation of Required Drawdowns of Assets

Year	Market Value of Assets (MVA)	Policy Contribution Rate (PCR)	Normal Cost	Contributions			Administrative Expenses	Benefits paid	Required Asset Drawdowns as a Percentage of MVA	
				STIP Transfers	Employer Contributions	Employee Contributions				
	($B)	%	%	($B)	($B)	($B)	($B)	($B)	Including STIP	Net of STIP
2012	41.8	28.56	18.09	0.935*	0.915459	0.272421	0.032839	2.273071	0.435%	2.672%
2013	45.3	30.33	18.35	0.00	0.810056	0.415641	0.037427	2.487368	2.868%	2.868%
2014	52.8	28.79	18.24	0.00	1.580876	0.577466	0.037642	2.687540	1.074%	1.074%
2015	55.1	28.44	18.36	0.70	1.810046	0.793012	0.048286	2.976993	-0.504%	0.766%
2016	54.2	27.99	18.16	0.56	1.958683	0.845036	0.048339	3.105641	-0.394%	0.646%
2017	62.1	27.00	18.00	0.48	2.075576	0.891988	0.044128	3.320988	-0.134%	0.640%
2018	66.8	26.33	17.90	0.39	2.112874	0.941144	0.036689	3.587555	0.267%	0.854%
2019	70.3	33.76	20.90	0.50	1.908651	0.956544	0.061982	3.816437	0.730%	1.441%
2020	70.9	34.47	20.60	0.50	1.944026	1.019302	0.065990	3.945001	0.772%	2.376%
2021	91.7	32.68	20.50	0.60	2.105058	1.053939	0.064826	4.299910	0.661%	1.315%
2022	81.4	32.87	20.70	0.70	2.192621	1.105405	0.084759	4.534161	0.763%	1.623%
2023	88.2	32.88	20.04	0.50	2.270474	1.206097	0.076629	4.764454	0.980%	1.547%
2024	98.7	32.13	20.02	0.50	2.501069	1.332768	0.102512	5.124240	0.905%	1.411%
2025	110.7	30.44	19.96	0.80	2.890291	1.484516	0.104729	5.509922	0.397%	1.120%

* In 2012, it was more cost-effective to use external borrowing than transfers from STIP to add $900M to employer contributions.

The table shows selected variables for 2012-25 using TFIR's UCRP data. All figures are taken from annual reports to The Regents or computed from those figures. The Market Value of Assets (MVA) is self-explanatory and is used in this calculation to express asset drawdowns as a percentage of total assets in the Plan. Normal cost is the required contribution, expressed as a percentage of covered payroll, to meet future pension obligations based on the current year of service by active employees. Contributions are separated into three categories: transfers from STIP, employer contributions, and employee contributions, all in billions of dollars. [14] *Note that employer contributions, unlike the values reported in Regents documents, do not include transfers from the previous column.* Administrative expenses presumably include RASC, OCIO, and other categories, expressed in billions of dollars. Benefits paid include mainly regular monthly pensions, lump-sum cash-outs (for individuals in the 1976 tier), and return of

[14] While reporting six decimal places may seem unnecessary, doing so allows verification of our figures using those reported by Segal, in reports presented to The Regents each November.

employee contributions to those who separate and withdraw these funds. Finally, the two columns representing asset drawdowns are from our calculations. In the first, *Including STIP*, we compare administrative expenses and benefits payments with the total inflow, regular contributions plus transfers from STIP. In the second, *Net of STIP,* STIP transfers are not included. Hence the figures match in years with no STIP transfers and otherwise, required drawdowns net of STIP are higher. As described earlier, a positive number represents outlays in excess of inflows, requiring asset sales, or drawdowns.

APPENDIX 2: Some Facts About UCRP Investments

There are a lot of terms that are difficult to keep straight in pension accounting. We described some of the most important ones for our proposal earlier in the document. Here, we return to providing background, with the aim of drawing on data concerning UCRP. The goal is to provide a common frame of reference for the Plan's funded status.

1. UCRP is probably over 90% funded at present, meaning the assets currently in the Plan are projected to be sufficient to meet at least 90% of all future pension obligations based on current actuarial assumptions. CIO Bachher told the UCRS Advisory Board in February that the Plan was 90% funded using market value, and markets have remained strong.

2. The assumed rate of return is a key actuarial assumption, and it is chosen to be below the expected value of asset returns, which in turn depends on the pattern of investments chosen by The Regents.

3. Employer and employee contributions to the plan were suspended from 1990 to 2010 because plan was over funded. Since the resumption of contributions in 2010, asset growth has generally kept up with growth in the Plan's liabilities. When examining the percentage growth in assets from each year since 2010 to 2025 values (i.e. 2010-2025, 2011-2025, …), the period 2021-2025 was the only one for which the Market Value of Assets (MVA) did not grow faster than the rate of growth observed in the Accrued Actuarial Liability (AAL).

4. AAL grows steadily, roughly 5 to 7 percent each year, with the exception of years when there is a decision to change the underlying actuarial assumptions.[15] Past changes reducing the assumed rate of return from 7.5% to 7.25% and more recently from 7.25% to 6.75% brought larger annual increases in AAL as those one-time changes were incorporated. A rule of thumb actuaries use is that a 1% increase in the actuarial rate of return would reduce the AAL by 15%. It follows that the unfunded portion will also be smaller, since MVA does not change.

5. Growth in AAL is predictable. The previous year's liability, minus pensions paid (which reduce the liability because they no longer are counted in that measure), should grow at the assumed rate of return as every future obligation moves one year closer to the present. Adding new liability captured by annual Normal Cost[16] generates predictions that track the AAL reasonably well.

6. Normal Cost (measured as a percentage of payroll) changes very little from year to year, with larger changes occurring when assumptions are changed. In 2018, Normal Cost was 17.9% of

[15] Actuarial assumptions are compared to observed data in experience studies conducted every 3 to 5 years by the Regents' consulting actuary, Segal. For instance, summaries and full reports for the 2019 study and the 2023 study can be found on the Regents web site.

[16] Normal cost measures the current amount that must be contributed to the Plan to cover anticipated future pension obligations resulting from the current year of service. Since the funds will be invested to meet those obligations, a higher rate of return corresponds to a lower figure for normal cost.

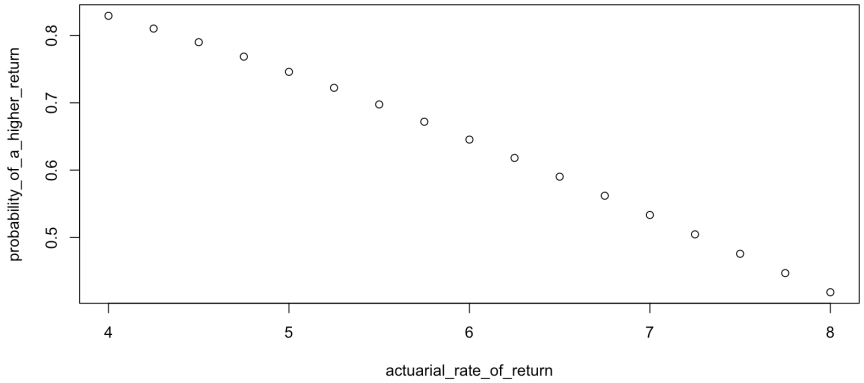
covered payroll and jumped by 3 percentage points in 2019, with the reduction in the assumed rate of return and changes in other assumptions. Since then, it has decreased gradually. The most recent figure was just under 20% of covered payroll. Measured in dollars and not adjusted for inflation, Normal Cost has nearly doubled since 2018, reflecting the combined effects of salary growth and growth in the size of the workforce.

7. The most recent Policy Contribution Rate (PCR) was just over 30% of payroll, comprising both Normal Cost and amortization of the unfunded portion of UCRP's unfunded liability. Both the unfunded liability and Normal Cost would decrease, with an increase in the assumed rate of return. The TFIR proposal then would reduce AAL by roughly 7.5%, more than half of the current unfunded portion. Normal Cost would also be reduced. The annual savings to UC from doing nothing except for rescinding planned increases in the employer contribution would represent around $600M; that figure would likely more than double, if accompanied by reductions in contributions as the PCR decreases.

8. Administrative costs are not trivial in absolute dollars, but they are not the cause of funded ratios below 100%. Using the most recent year, the total administrative cost of $104.7M represents roughly 0.5% of covered payroll. The rate of return calculation includes 0.8% to cover these costs. Even if administration suddenly disappeared UCRP's funded status would not change in any meaningful way.

9. Relatively small changes in the assumed rate of return bring large changes in dollar values but the empirical support for those alternative assumptions is just about indistinguishable from the justification for 6.75%. In the most recent Experience Study, Segal calculated a 0.56 probability that average returns over 15 years would exceed 6.75%, saying between 0.5 and 0.6 (i.e., 50% and 60% "confidence") is standard.[17] That same probability for a 7% rate of return is just below 0.54 and it is just over 0.50 for a 7.15% rate of return. By most standards, the forecasts based on these three rates and others would be considered indistinguishable. The graph below shows the relationship between these probabilities and the assumed rate of return, using Segal's figures.

[17] Segal follows what we infer to be standard actuarial practice in referring to probabilities as levels of confidence, a practice we would prefer to avoid because of the potential for confusion with more standard confidence intervals.



10. The assumed rate of return is treated as though it has high precision, but the standard deviation for annual portfolio returns is roughly twice the expected value. Using Segal's figures, it is difficult to distinguish between 6.75% and nearby rates of return using probability statements. That is even more so when it is recognized that a standard such as between 50 and 60 percent does not correspond to any particular notion of an optimal decision rule. Not only are the probabilities very close to each other, the calculations ignore randomness in the rate of inflation and also the fact that the parameters of the multivariate normal distribution for the assumed distribution for returns for various asset categories are themselves estimated but treated as population values. These facts do not by themselves argue against using 6.75%, but they demonstrate clearly that strong beliefs about 6.75% compared to nearby values are simply that: they are merely beliefs and not supportable by evidence. But treating such figures as though they are precise and follow from rigorous analysis imposes strong financial constraints on UC that are arguably more damaging than necessary. The case for imposing them is not at all strong.