COMPOUND INTEREST CALCULATOR

Determine how much your money can grow using the power of compound interest. You can find out if you're dealing with a registered investment professional with a free simple search on Investor.gov's homepage.

* DENOTES A REQUIRED FIELD

Step 1: Initial Investment

* Amount of money that you have available to invest initially.	$34,500,000

Step 2: Contribute

Amount that you plan to add to the principal every month.	$0
* Length of time, in years, that you plan to save.	19

Step 3: Interest Rate

* Your estimated annual interest rate.	7.5%
Range of interest rates (above and below the rate set above) that you desire to see results for.	

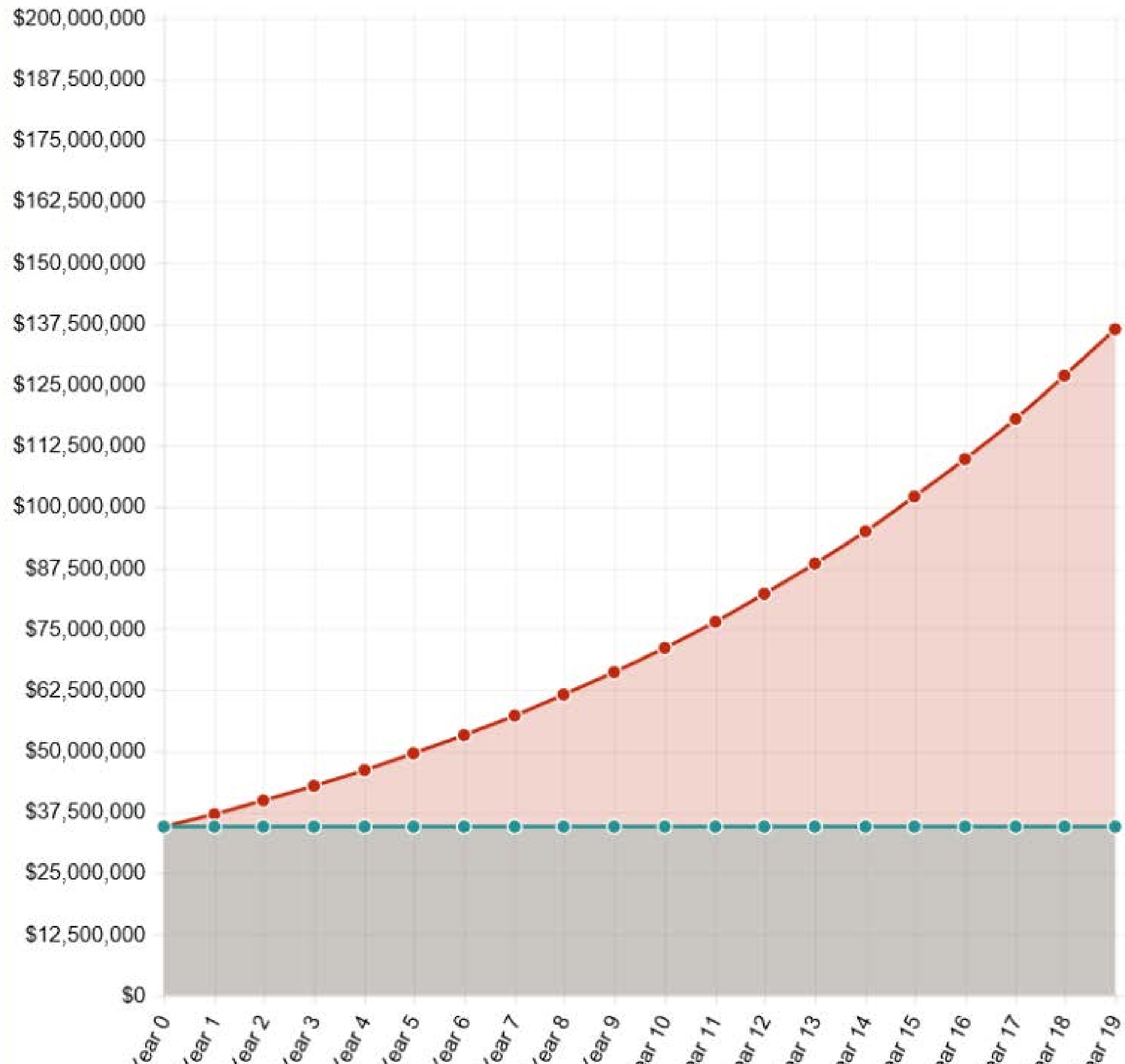
Step 4: Compound It

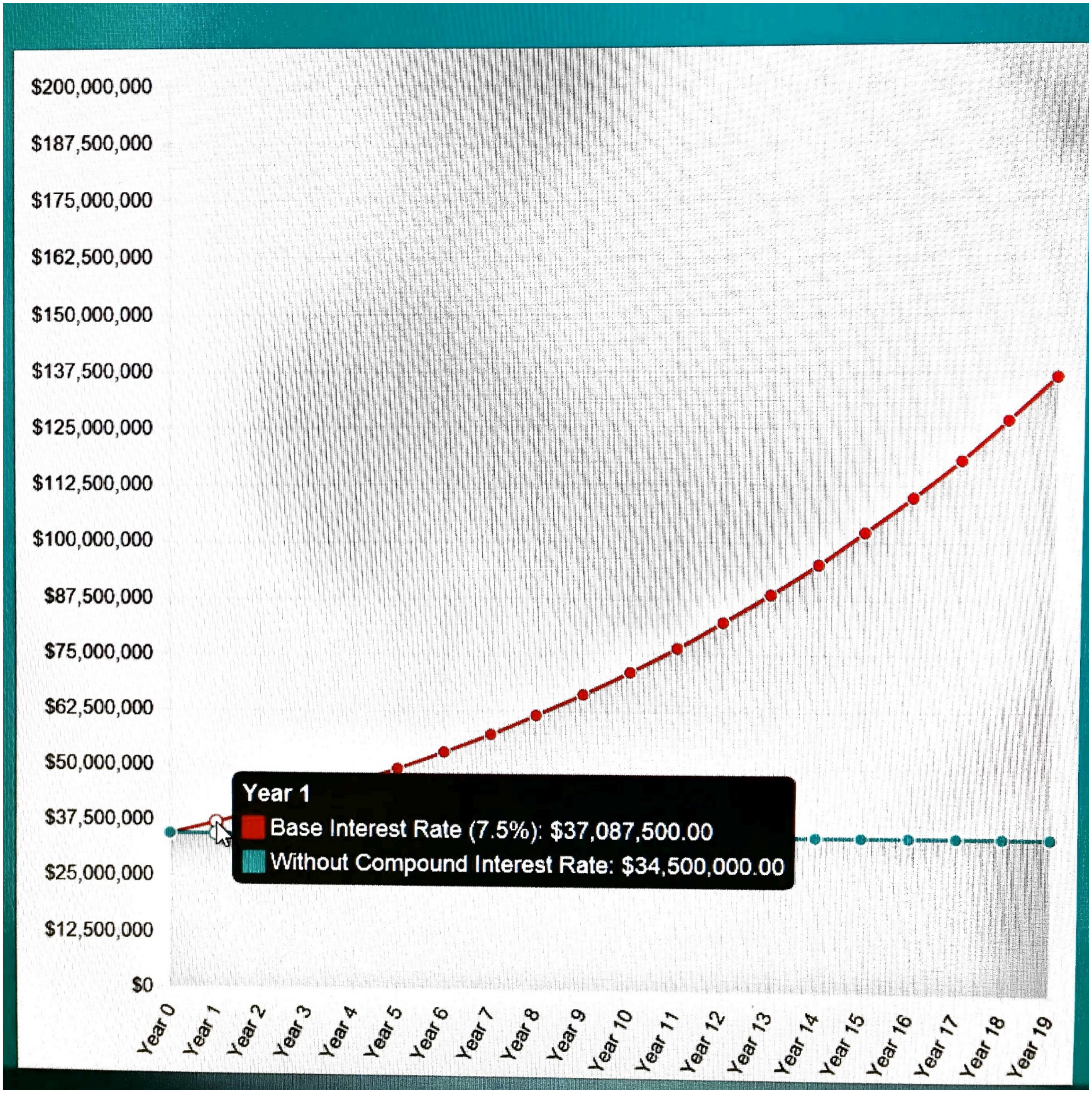
* Times per year that interest will be compounded.	ANNUALLY

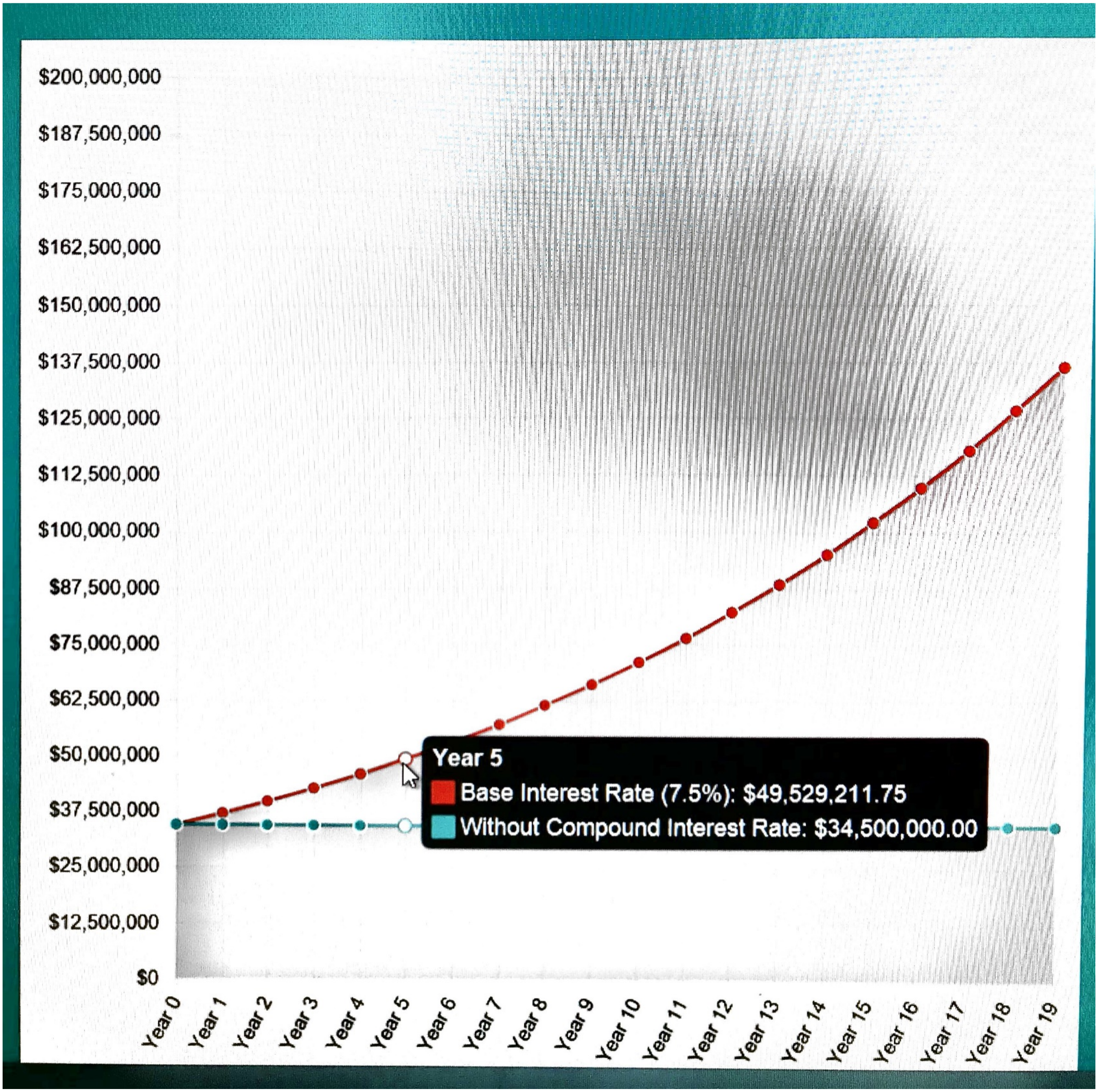
In 19 years, you will have $136,326,384.15

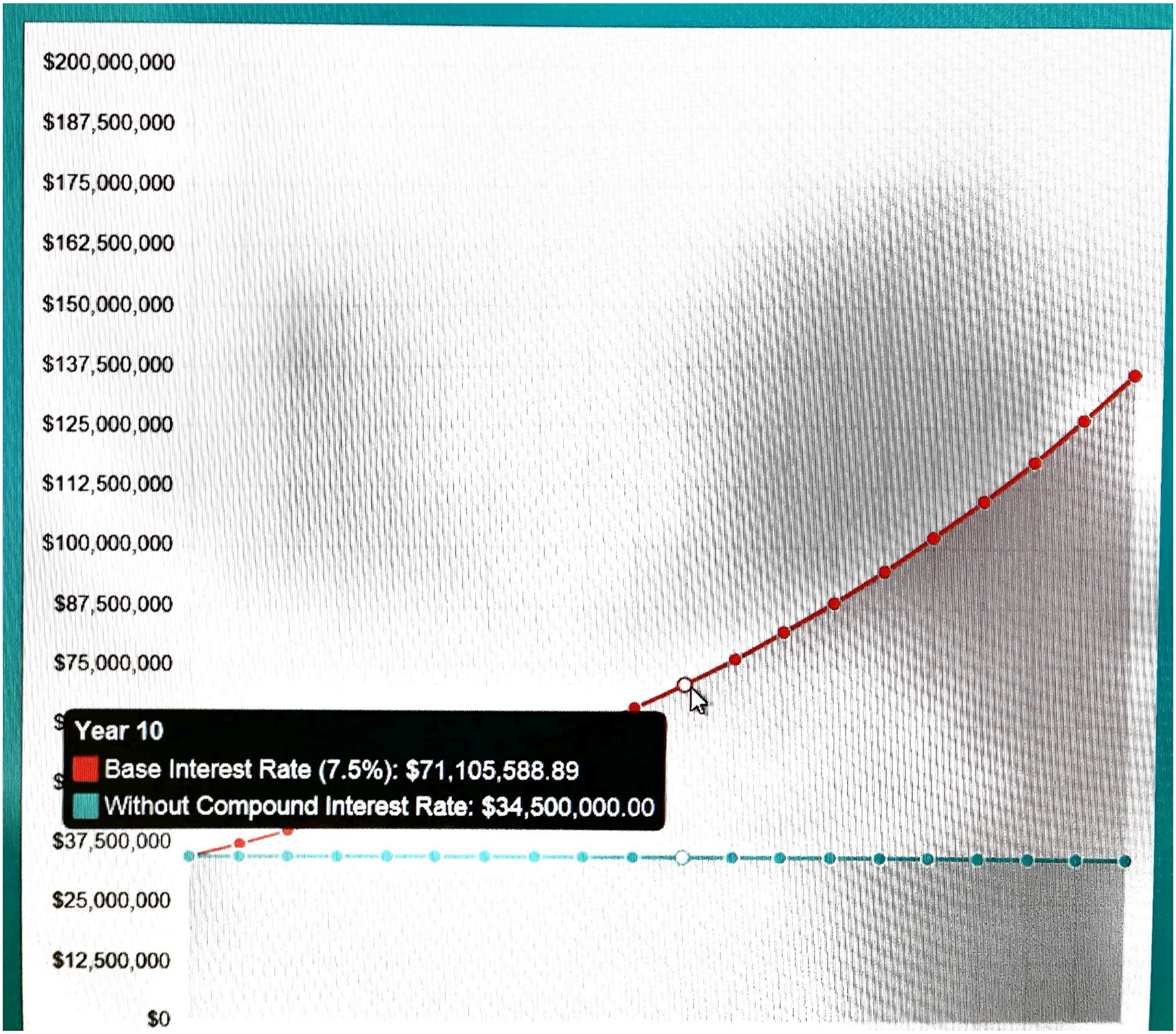
The chart below shows an estimate of how much your initial savings will grow over time, according to the interest rate and compounding schedule you specified.

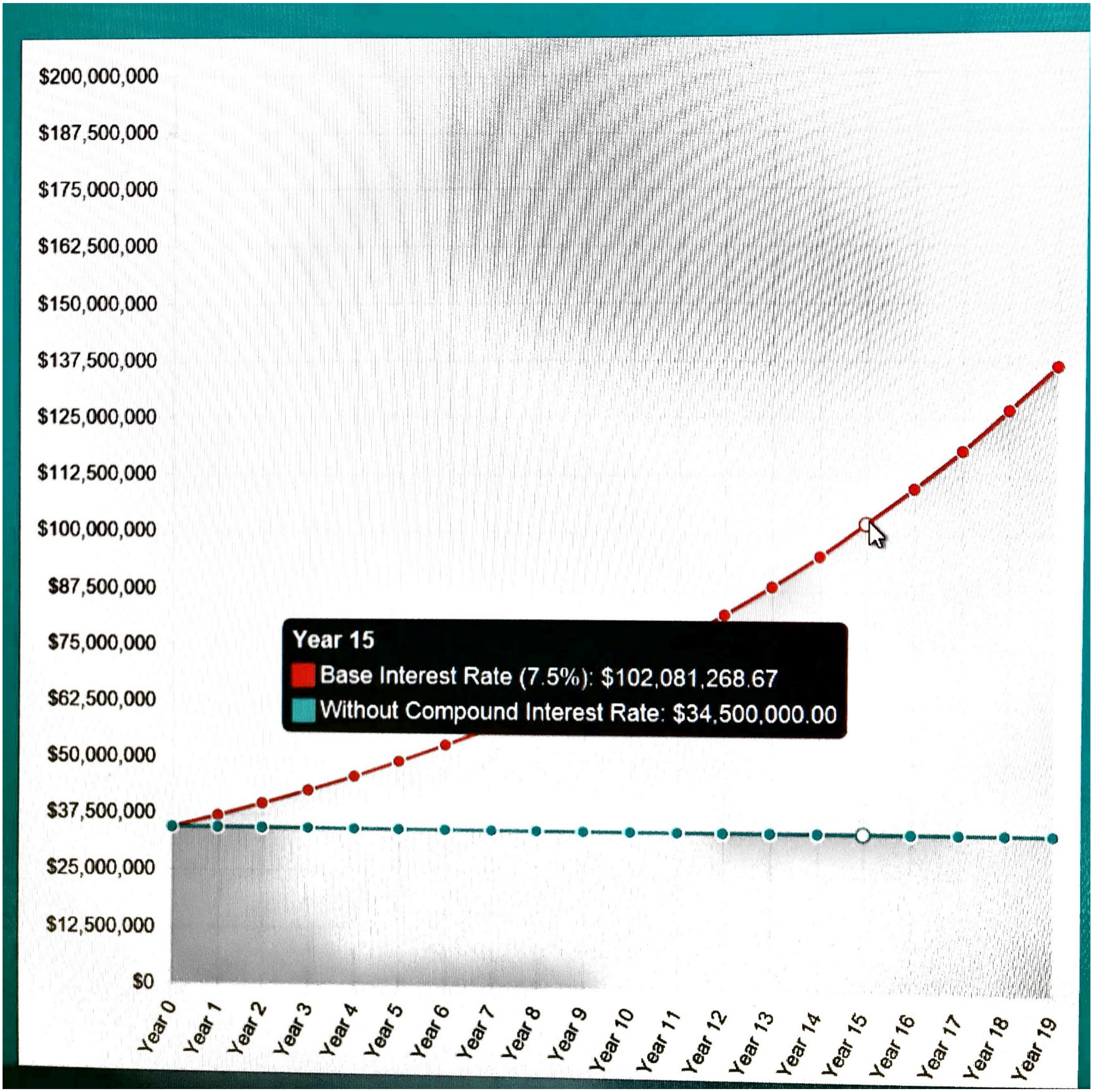
Please remember that slight adjustments in any of those variables can affect the outcome. Reset the calculator and provide different figures to show different scenarios.




$200,000,000
$187,500,000
$175,000,000
$162,500,000
$150,000,000
$137,500,000
$125,000,000
$112,500,000
$100,000,000
$87,500,000
$75,000,000
$62,500,000
$50,000,000
$37,500,000
$25,000,000
$12,500,000
$0
Year 1
Base Interest Rate (7.5%): $37,087,500.00
Without Compound Interest Rate: $34,500,000.00
Year 0
Year 1
Year 2
Year 3
Year 4
Year 5
Year 6
Year 7
Year 8
Year 9
Year 10
Year 11
Year 12
Year 13
Year 14
Year 15
Year 16
Year 17
Year 18
Year 19


$200,000,000
$187,500,000
$175,000,000
$162,500,000
$150,000,000
$137,500,000
$125,000,000
$112,500,000
$100,000,000
$87,500,000
$75,000,000
$62,500,000
$50,000,000
$37,500,000
$25,000,000
$12,500,000
$0
Year 5
Base Interest Rate (7.5%): $49,529,211.75
Without Compound Interest Rate: $34,500,000.00
Year 0
Year 1
Year 2
Year 3
Year 4
Year 5
Year 6
Year 7
Year 8
Year 9
Year 10
Year 11
Year 12
Year 13
Year 14
Year 15
Year 16
Year 17
Year 18
Year 19


$200,000,000
$187,500,000
$175,000,000
$162,500,000
$150,000,000
$137,500,000
$125,000,000
$112,500,000
$100,000,000
$87,500,000
$75,000,000
$37,500,000
$25,000,000
$12,500,000
$0
Year 10
Base Interest Rate (7.5%): $71,105,588.89
Without Compound Interest Rate: $34,500,000.00


$200,000,000
$187,500,000
$175,000,000
$162,500,000
$150,000,000
$137,500,000
$125,000,000
$112,500,000
$100,000,000
$87,500,000
$75,000,000
$62,500,000
$50,000,000
$37,500,000
$25,000,000
$12,500,000
$0
Year 15
Base Interest Rate (7.5%): $102,081,268.67
Without Compound Interest Rate: $34,500,000.00
Year 0
Year 1
Year 2
Year 3
Year 4
Year 5
Year 6
Year 7
Year 8
Year 9
Year 10
Year 11
Year 12
Year 13
Year 14
Year 15
Year 16
Year 17
Year 18
Year 19

#1

Contribution Year	Contribution	UAAL Balance	Actuary Current Contrib*	Variance from actuary
2018	92,913,342	1,518,802,788	92,913,342	-
2019	97,559,009	$1,531,561,664.00	97,559,009	-
2020	119,503,106	$1,522,525,331.00	119,503,106	-
2021	123,088,199	$1,509,094,170.00	123,088,199	-
2022	126,780,845	$1,490,827,055.00	126,780,845	-
2023	130,584,270	$1,467,246,431.00	130,584,270	-
2024	134,501,798	$1,437,835,481.00	134,501,798	-
2025	138,536,852	$1,402,035,077.00	138,536,852	-
2026	142,692,958	$1,359,240,500.00	142,692,958	-
2027	146,973,747	$1,308,797,913.00	146,973,747	-
2028	151,382,959	$1,250,000,564.00	151,382,959	-
2029	155,924,448	$1,182,084,698.00	155,924,448	-
2030	160,602,181	$1,104,225,165.00	160,602,181	-
2031	165,420,246	$1,015,530,691.00	165,420,247	(1)
2032	170,382,853	$915,038,791.00	170,382,854	(1)
2033	175,494,339	$801,710,297.00	175,494,340	(1)
2034	180,759,169	$674,423,474.00	180,759,170	(1)
2035	186,181,944	$531,967,686.00	186,181,945	(1)
2036	191,767,402	$373,036,588.00	191,767,403	(1)
2037	197,520,424	$196,220,798.00	197,520,426	(2)
2038	203,446,037	$17.00	203,446,038	(1)
2039	0	$0.00		-
2040	0	$0.00		-
2041	0	$0.00	0	-
2042	0	$0.00	0	-
2043	0	$0.00	0	-
2044	0	$0.00	0	-
2045	0	$0.00	0	-
2046	0	$0.00	0	-
2047	0	$0.00	0	-
	3,192,016,128		3,192,016,137	(9)

#2

Contribution Year	Contribution	UAAL Balance	Actuary Current Contrib*	Variance	3% number current contrib
2018	92,913,342	1,518,802,788	92,913,342	-	92,913,342
2019	132,059,009	$1,495,791,302.00	97,559,009	34,500,000	97,559,009
2020	119,503,106	$1,484,072,192.00	119,503,106	-	119,503,106
2021	123,088,199	$1,467,757,045.00	123,088,199	-	123,088,199
2022	126,780,845	$1,446,389,646.00	126,780,845	-	126,780,845
2023	130,584,270	$1,419,476,217.00	130,584,270	-	130,584,270
2024	134,501,798	$1,386,482,501.00	134,501,798	-	134,501,798
2025	138,536,852	$1,346,830,623.00	138,536,852	-	138,536,852
2026	142,692,958	$1,299,895,712.00	142,692,958	-	142,692,958
2027	146,973,747	$1,245,002,266.00	146,973,747	-	146,973,747
2028	151,382,959	$1,181,420,243.00	151,382,959	-	151,382,959
2029	155,924,448	$1,108,360,853.00	155,924,448	-	155,924,448
2030	160,602,181	$1,024,972,032.00	160,602,181	-	160,602,181
2031	165,420,246	$930,333,573.00	165,420,246	-	165,420,247
2032	170,382,853	$823,451,889.00	170,382,853	-	170,382,854
2033	175,494,339	$703,254,377.00	175,494,339	-	175,494,340
2034	180,759,169	$568,583,360.00	180,759,169	-	180,759,170
2035	186,181,944	$418,189,564.00	186,181,944	-	186,181,945
2036	191,767,402	$250,725,107.00	191,767,402	-	191,767,403
2037	197,520,424	$64,735,956.00	197,520,424	-	197,520,426
2038	67,119,668	$0.00	203,446,037	(136,326,369)	203,446,038
2039	0	$0.00		-	
2040	0	$0.00		-	
2041	0	$0.00	0	-	
2042	0	$0.00	0	-	
2043	0	$0.00	0	-	
2044	0	$0.00	0	-	
2045	0	$0.00	0	-	
2046	0	$0.00	0	-	
2047	0	$0.00	0	-	
	3,090,189,759		3,192,016,128		

3,192,016,137	savings with extra contribution		
3,189,069,128	1 mill	$	2,947,009
3,186,114,016	2mill	$	5,902,121
3,168,403,700	8 mill	$	23,612,437
3,162,500,957	10 million	$	29,515,180
3,103,471,460	30 million		88,544,677
3,090,189,759	34.5 million		101,826,378

HISTORY OF DISCIPLINED INCREMENTAL STEPS TO REDUCE PENSION AND RETIREE HEALTH CARE LIABILITIES

2005: Teacher Study made changes to the State's actuarial methods and put full funding of the ARC on track. The Legislature has consistently adopted a budget with full funding of the ARC since 2007

2008: Committee restructured state system (VSERS) Group F benefits, lengthening age of retirement, effective in FY 2009, in concert with health care changes

2009: Pension and Health Care Study completed providing basis for negotiated savings over the next few years for both VSERS and the teachers' (VSTRS) system

2010 VSTRS: Lengthened age for normal retirement, contribution increases, and other changes, effective in FY 2011, resulting in **$15 million in annual pension savings. In addition to pension costs, additional health care savings accrued**

2011 VSERS: Employee contribution rate increases beginning FY 2012, initially generating **$5 million in savings per year, increasing each year**

2011-2012 VSTRS: Secured **one-time revenues in excess of $5 million for VSERS and VSTRS** under the Federal Early Retirement Reinsurance Program

2012 - 2015: Incremental increases in employee and employer contributions to municipal system (VMERS), demonstrating shared responsibility by all parties. These changes put VMERS on a stronger financial track

2014 VSTRS: additional contribution increases for new and non-vested members, effective FY 2015, generating **$1 million initial annual savings, increasing each year**

2014 VSTRS: Statute change permitting that teacher pension costs be charged to federal grants, effective FY 2016, creating an estimated **$3 to $4 million of savings per year**

HISTORY OF DISCIPLINED INCREMENTAL STEPS TO REDUCE PENSION AND RETIREE HEALTH CARE LIABILITIES (continued.)

- **2015:** Created Retired Teachers' Health and Medical Benefits Fund starting FY 2015
  - Since the 1980s, health care premiums for teachers were paid out of a sub-trust of teachers pension fund: by 2014 this arrangement was costing over $20 million per year in interest costs
  - Collaborative solution: Successfully convened over a dozen stakeholders, including employee group, to address the problem with combined pension/health care changes
  - In addition to pension and health care changes previously stated, a new health care assessment for LEAs was implemented, linking local employment decisions to the benefit costs
  - **Projected to save taxpayers $480 million in unfunded liability interest costs through FY 2038**
- **2016:** Changes to the amortization financing schedule for VSERS and VSTRS **will result in saving $165 million in interest from present to 2038**
- **2016:** Increased employee contributions resulting in **$1.2 million in annual savings, with savings growing larger in future years**

At the same time creating additional Transparency and Accountability

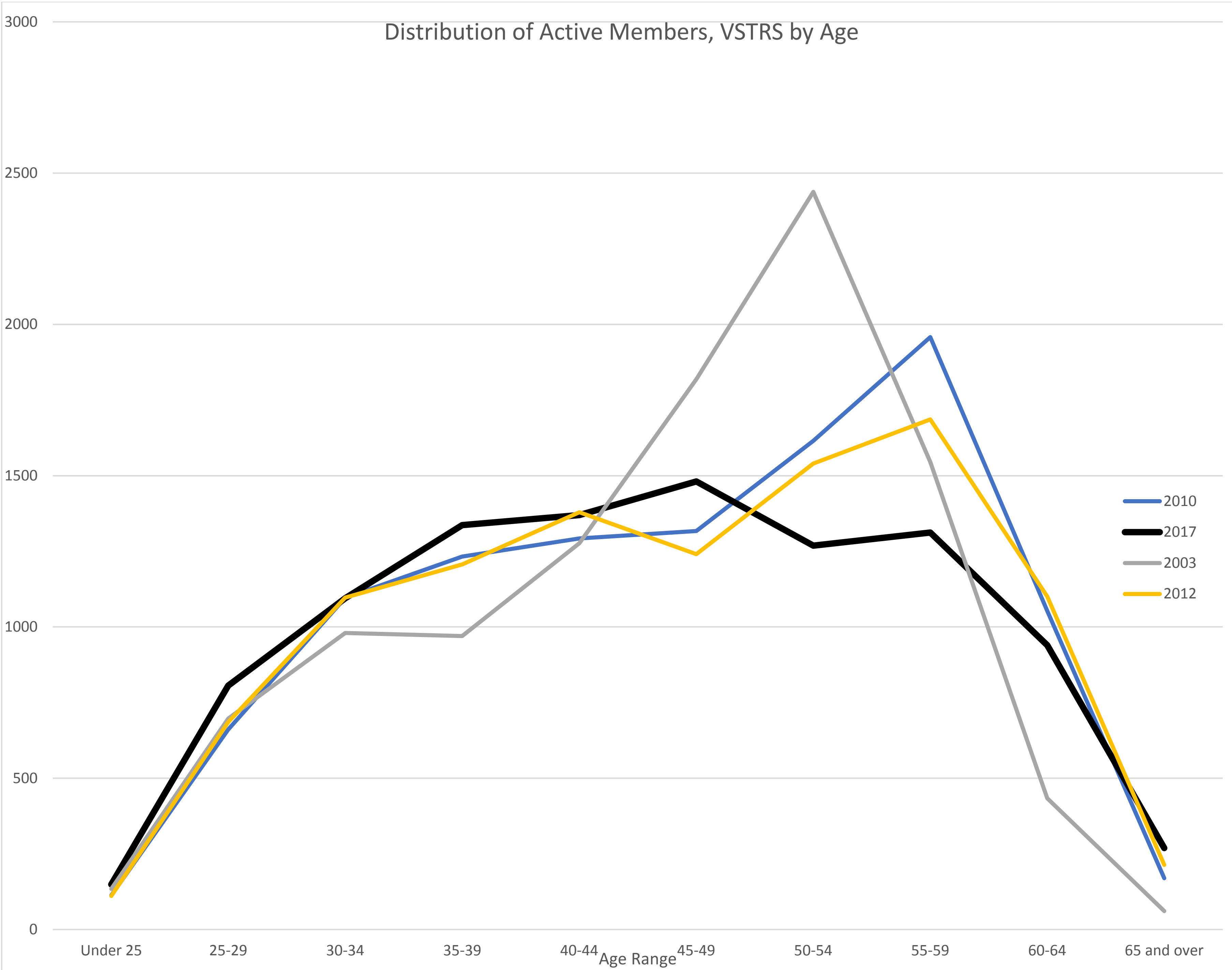
- **2013:** Pension forfeiture statute adopted for all three systems (VSERS, VSTRS, VMERS)
- **2015:** VSERS Disability retirement reform permitting wage verification of disability pensioners

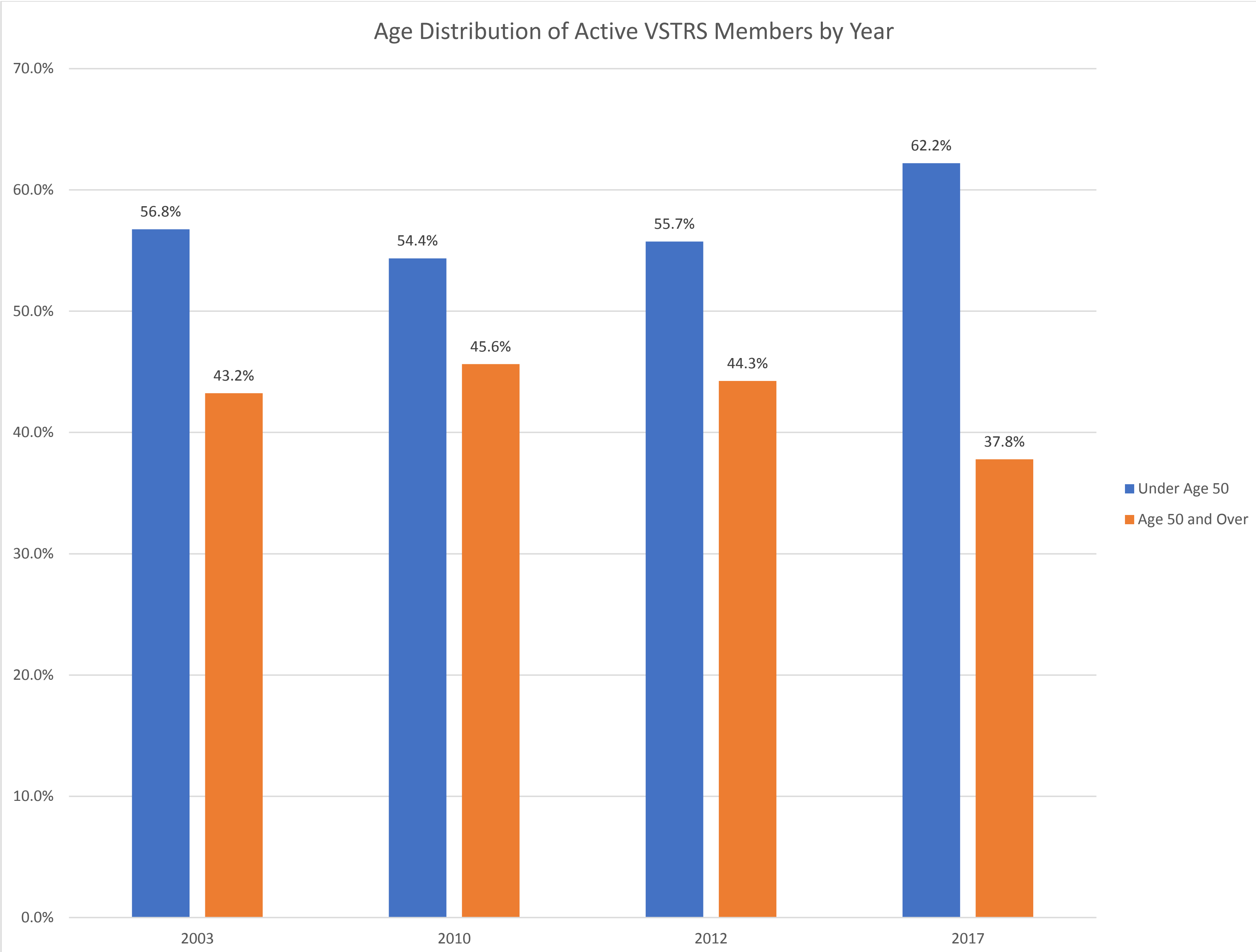
Collaborative Approach Key to Success

- All benefit changes made though collaborative efforts involving Administration, Treasurer's Office, Legislature and employee groups
- No court litigation/disruptions in planned implementations

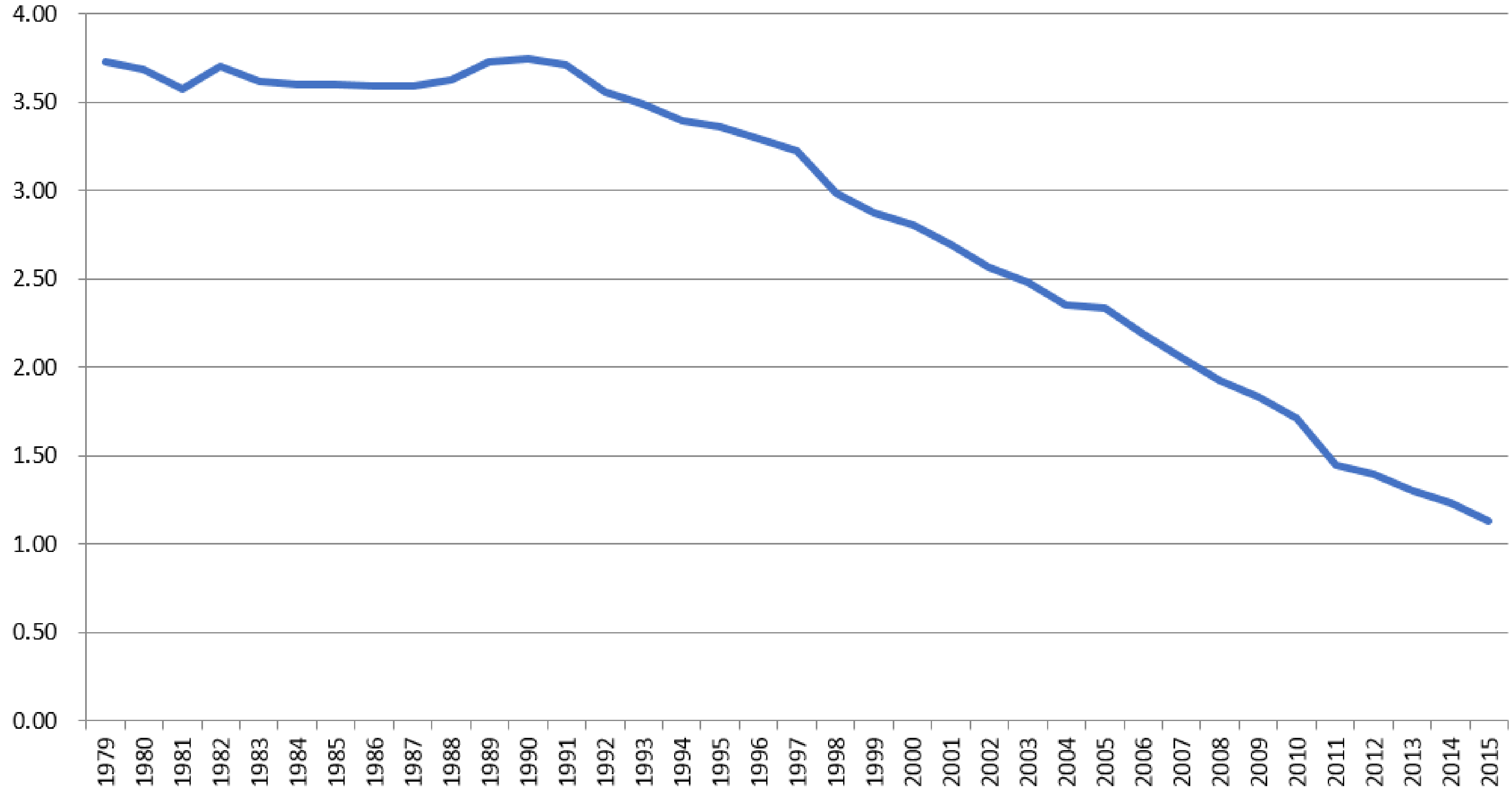
Recent Actuarial Assumption Changes:

- Lowered investment rate of return assumption to 7.5% based on independent analysis by actuary and pension consultant
- Currently updating mortality table assumptions


Distribution of Active Members, VSTRS by Age
3000
2500
2000
1500
1000
500
0
Under 25
25-29
30-34
35-39
40-44
45-49
50-54
55-59
60-64
65 and over
Age Range
2010
2017
2003
2012


Age Distribution of Active VSTRS Members by Year
70.0%
60.0%
50.0%
40.0%
30.0%
20.0%
10.0%
0.0%
56.8%
43.2%
54.4%
45.6%
55.7%
44.3%
62.2%
37.8%
2003
2010
2012
2017
Under Age 50
Age 50 and Over

Active to Retiree Ratio
VSTRS (Teachers Retirement System)



Rating Agency Comments on Reserves:

- "Vermont's conservative fiscal management and healthy financial reserves are important strengths for the state"

  -Moody's Investor Service, Credit Opinion, State of Vermont, August 10, 2017.

- The Aaa rating reflects Vermont's strong financial management, which features conservative fiscal policies, consistent governance, and a proven commitment to maintaining healthy reserve balance….The stable outlook reflects the state's proven ability to continue operating on a balanced basis and maintaining a solid rainy day fund balance regardless of economic cycles. The outlook also anticipates slow progress toward achieving stronger funding of the state's pension liabilities."

  -Moody's Investor Service, Credit Opinion, State of Vermont, September 23, 2015.

- "Although we do not envision it at this time, given Vermont's history of proactively managing the state budget and recent actions to address retirement liabilities, substantial deterioration of budget reserves or a deteriorating liability position could negatively pressure the rating."

  -S&P, Ratings Direct Vermont; General Obligation, August 11, 2017.

- Outlook: The stable outlook reflects Vermont's slower-than-average economic recovery, which continues to pressure the budget, in our view. In addition, pension and OPEB liabilities remain high relative to those of state peers. We believe that Vermont has a very strong budget management framework and should this lead to improved reserve levels in the future, a higher rating could be warranted. In addition, we believe that there has been progress in increasing pension contributions and the state has taken certain actions to begin to address OPEB liability. A demonstrated improvement in the pension and OPEB liability position could also translate to a higher rating. Although we do not envision it at this time, given Vermont's history of proactively managing its budget and recent actions to address retirement liabilities, substantial deterioration of budget reserves, or a deteriorating liability position could negatively pressure the rating.

  -S&P, Ratings Vermont; General Obligation, September 22, 2015.

- "For the education fund, the enacted fiscal 2018 budget includes draws on unallocated balances from prior years as well as on the budget stabilization reserve to fund a shift in the teachers' pension normal cost to the education fund from the general fund. The budget stabilization reserve balance is budgeted to decline to approximately $25 million, or 3.6% of revenues. … The governor also intends to recommend in his fiscal 2019 executive budget that the education fund budget stabilization reserve be restored to its 5% statutory maximum."

-Fitch Ratings, August 11, 2017

- This past year, Moody's published a report, "Stress-Testing States", and looked at a number of scenarios in a hypothetical recessionary downturn and noted that "in order to weather the next recession without having to resort to potentially disruptive fiscal measures, an average state would need to have more than 10% of its budget put away in reserve", and noted Vermont's mix of revenues and spending would likely require more. As Moody's noted, they are not projecting the timing or severity of a recession but did note that downturns are an inevitable part of the business cycle. Vermont needs to be prepared.

- From Pew report:[1]
  - "According to the credit rating agency specialists that Pew interviewed, withdrawals from reserves are unlikely to result in a downgrade as long as they are made in response to broader economic and fiscal conditions, such as an economic downturn that shrinks revenue."….
  - "On the other hand, the rating agencies advise policymakers against making arbitrary withdrawals from rainy day funds or using reserves to address a longstanding structural budget gap-the difference between the revenue collected and what is available to cover increasing costs."…
  - "Further, Pew researchers found that making withdrawals from reserves during periods of growth may be viewed as a credit negative by the rating agencies…"

Rating Agency Comments on Government and Process:

- Vermont's exceptionally strong gap-closing capacity derives from institutional and statutory mechanisms, and a demonstrated ability to prudently manage through economic downturns. Official revenue forecasts are updated at minimum twice a year through the Emergency Board, a consensus process involving the administration and legislature.

-Fitch Ratings, August 11, 2017

[1] Pew Charitable Trusts, "Rainy Day Funds and State Credit Ratings", May 2017

- **Vermont's governance is a key strength.** The state's financial management has demonstrated its ability to adjust its budget to revenue shortfalls. The state has run consistent surpluses in spite of lackluster revenue growth in some years and increasing pension contributions.

  -Moody's Investor Service, Credit Opinion, State of Vermont, August 10, 2017.

- GOVERNANCE: We consider Vermont's fiscal management to be strong. It utilizes consensus forecasting for estimating revenues, has increased the frequency of its forecasting during economic downturns, and passes on-time budgets. The state's willingness to continue allocating money to its rainy day funds also reflects well on management.

  -

- S&P Global Ratings considers Vermont's financial management practices strong under its financial management assessment methodology, indicating financial practices are strong, well embedded, and likely sustainable.

  -S&P, Ratings Direct Vermont; General Obligation, August 11, 2017

- CONSERVATIVE FINANCIAL MANAGEMENT: Vermont's strong fiscal management practices anchor the state's credit quality and offset risks posed by its relatively narrow economy. The state's revenue stream is diverse and estimates are updated at least twice a year. The state takes timely action to maintain balance, and budget stabilization reserves have been maintained at statutory maximum levels despite periods of declining revenue.

  -Fitch Ratings, September 23, 2015.

- Although Vermont's revenues are subject to economic volatility, we expect the state to adjust well to economic cycles thanks to a comprehensive consensus planning regime as well as a firm commitment to a sound fiscal position.

  -Moody's Investor Service, Credit Opinion, State of Vermont, September 23, 2015.

.

(Vermont)

Moody's Credit review August 2017:

Credit Strengths

» Strong fiscal management leading to surpluses most years

» Good progress on funding pension liabilities

» Modest debt burden

Credit Challenges

» Above-average net pension liability

» Aging population and work force

» Slow economic and revenue growth

Rating Outlook

The stable outlook reflects the state's proven ability to balance its budget in a variety of operating environments. Having grown fund balance and liquidity substantially in the past few years, Vermont is financially well-positioned for the future.

Factors that Could Lead to an Upgrade

» Not applicable

Factors that Could Lead to a Downgrade

» Reversal of recent progress toward better funding of pension liabilities

» Reversal of historical track record of running budget surpluses even in bad years

» Protracted population loss, aging of population, and/or shrinkage of workforce leading to poor revenue trends and difficulty servicing liabilities.

Other Comments:

Finances and Liquidity: Vermont's conservative fiscal management and healthy financial reserves are important strengths for the state.

Pensions and OPEB

Vermont is an above-average pension state, and its net pension liability paired with its aging population remains the biggest credit weakness at the Aaa level. Nonetheless, Vermont's pension situation is nothing out of the ordinary for the New England region. Several neighboring states face similar pension challenges reflecting the demographic dynamics of an aging population and work force.

A few positives about Vermont's pension burden are important to note.First, Vermont is aggressively funding its net pension liability, and has adopted several measures (such as lowering the assumed rate of return) to assure it remains on track to full funding by 2037.

As a proxy to measure whether a state's net pension liabilities are generally on track to grow or shrink, we look at the contribution it would need to make to “tread water” (meaning to keep net pension liabilities unchanged assuming all actuarial assumptions are met), and compare that to its actual contribution. Vermont's actual contributions are more than its tread water contribution, reflecting its path toward improving funded ratios over the coming years. This cannot be said about all states, and Vermont's pension contributions put it in a much better position than some of the states with the biggest pension problems.

Governance

Vermont's governance is a key strength. The state's financial management has demonstrated its ability to adjust its budget to revenue shortfalls. The state has run consistent surpluses in spite of lackluster revenue growth in some years and increasing pension contributions.