The Evolution of SJCERA's Unfunded Actuarial Liability (UAL)

January 1, 2021 Valuation

The San Joaquin County Employees' Retirement Association (SJCERA) is a public pension plan providing a defined benefit life-time pension to many of San Joaquin County's diverse community of public servants - from firefighters and law enforcement officers to nurses and office assistants.

SJCERA conducts an annual valuation of the SJCERA Trust Fund to determine its current economic status. In the most recent valuation, for the period ending December 31, 2020, the system's professional actuary (Cheiron) calculated the Unfunded Actuarial Liability (UAL) of the fund to be approximately $1.8 billion. At the start of the millennium, as of December 31, 2000, there was no UAL at all, the system being more than 100% funded. The drivers and components that contributed to the evolution of SJCERA's current UAL are the subjects of this paper.

WHAT IS AN UNFUNDED ACTUARIAL LIABILITY (UAL)?

UAL is the difference between the actuarial liability and the actuarial value of assets accumulated to finance a public pension. In simpler terms, if you compare the cost of the pension promises with the actuarial value of SJCERA's assets, the promises currently exceed the assets. That shortfall is SJCERA's Unfunded Actuarial Liability.

A fully funded pension system with no UAL (as was the case for SJCERA in 2002), generally means that all of the actuary's assumptions as to the cost of the fund and growth of liabilities have been met, and the present value of the system's accumulated assets are sufficient to pay out all the pension promises to plan members.

But how does a public pension plan accrue the necessary funds for paying out benefits, and how can that process lead to a gap between the amount of assets held, and the present value of those future benefits?

A pension system's approach to building its assets in order to pay future benefits is not unlike the approach taken by many families in saving for their children's college education. If you expect your child's education is going to cost $100,000 eighteen years from now, you have three basic options:

(1) You could deposit a single lump sum amount representing the present value of that future cost into a savings account, similar to an endowment or trust, calculated to grow with sufficient earnings to total $100,000.

(2) You could save over time, depositing an equal amount year after year into an account and again assume that sufficient interest earnings will accrue to fully fund the cost when the big day arrives.

(3) You could wait until the child turns 18 and pull from your available resources at that time to pay the entire $100,000 in a single payment.

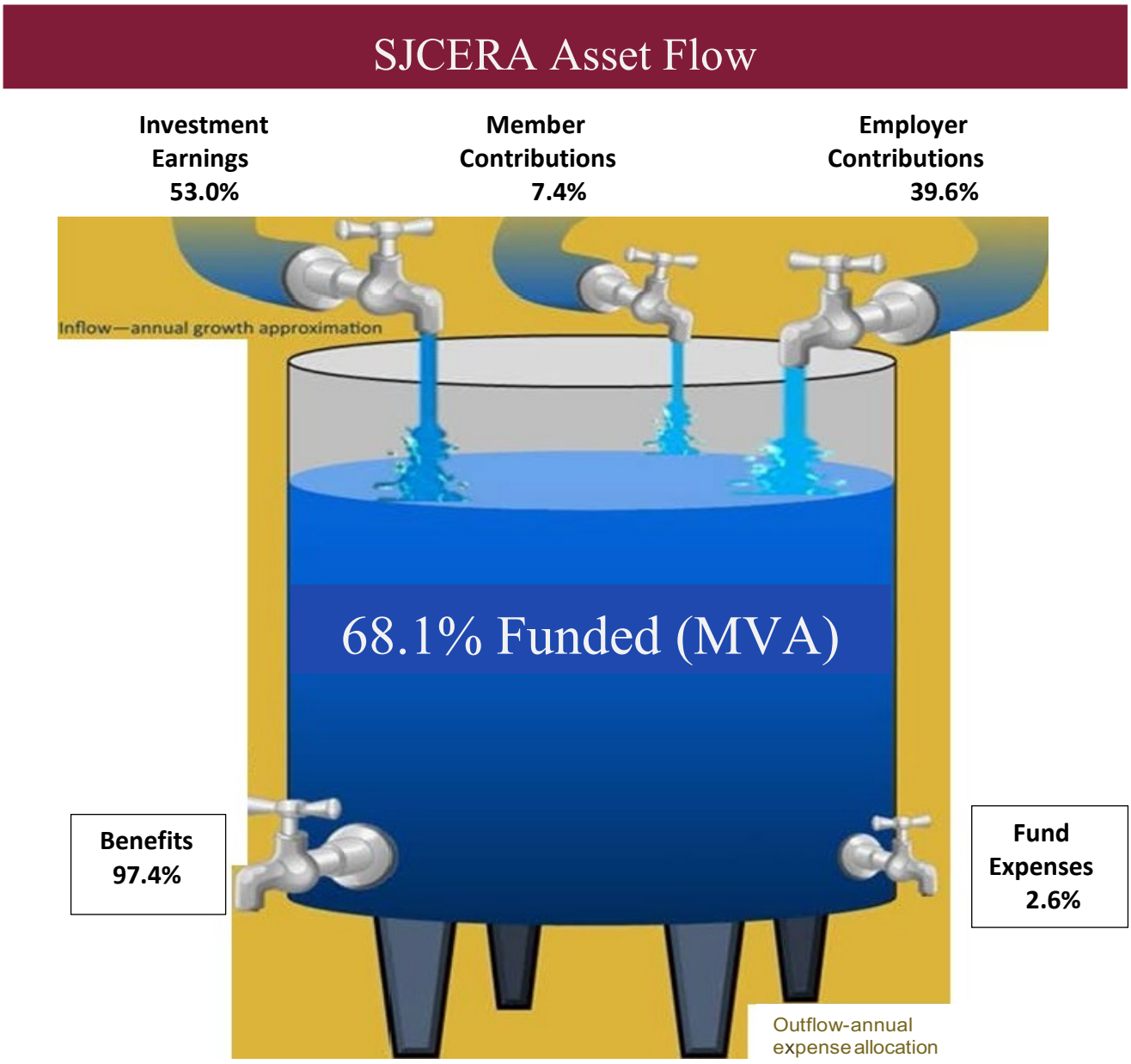
Public pension plans face similar choices in determining the best method for accruing sufficient resources to fund a member's benefit at retirement. Like most American families, the majority of public pension plan systems choose to pay a level percent of salary each year,

in order to gradually grow the amount needed to fund future retirements.

Determining how much to contribute each year is a primary challenge for any public pension system. For that reason, public pension plans use the expertise of a professional actuary to assist in planning the funding of those retirement benefits over the long term, allowing investment earnings on the contributions to fund the majority of the pension costs. In San Joaquin County those investment earnings provide the largest portion of retirement benefits being paid, greatly reducing the cost to our participating employers, members and taxpayers in providing public services to our community.

The job of a pension plan actuary includes estimating (or assuming) how much money should be contributed each year so the plan will have enough funds to pay the benefits promised by the plan throughout the lifetime of the member. The year-to-year stream of contributions should be as smooth and consistent as possible to avoid wreaking havoc on the budget of the employers.

The graph below shows a snapshot of SJCERA's funded status as of December 31, 2020 and the cash inflows and outflows from 1991 through 2020.



HOW DID SJCERA's CURRENT UAL DEVELOP?

The long-term cost of retiree benefits is based on a host of variables, the future values of which are unknown. There are many different events that can both cause a UAL to develop or even disappear. While actuaries try to pin down these variables through the use of best or at least reasonable assumptions and professional methodologies, the unexpected should be expected to occur.

There are six assumptions in particular that have the greatest impact on the actuary's estimates of plan funding:

1. The assumed rate of return on investments
2. The rate of increase in salaries
3. Member mortality
4. The age at which members choose to retire
5. How many members become disabled
6. How many members terminate their service earlier than anticipated

Finally, there are two other events that can have great impact on plan funding, events the actuaries can't anticipate:

(1) plan changes, that is, when a benefit formula is changed in some unanticipated manner by the plan sponsor, and

(2) differing actual experience, that is, when actual experience indicates that previous assumptions must be modified to reflect a more current reality. A key example here is life expectancy, which with the continued advances in medicine challenges actuaries in being able to accurately project average life expectancies in the coming decades.

Either will generally have an "unfunded" impact on the cost of the system.

First, a summary history of SJCERA's UAL as well as the plan's funded status:

Valuation Year	Actuarial Value of Assets	UAL	Funded Ratio (AVA)	Funded Ratio (MVA)
1990	$ 435,516,000	$ 45,440,000	90.6%	
1991	$ 489,547,000	$ 36,271,000	93.1%	
1992	$ 536,645,000	$ 46,333,000	92.1%	
1993	$ 586,276,000	$ 47,692,000	92.5%	120.0%
1994	$ 640,745,000	$ 55,010,000	92.1%	106.1%
1995	$ 760,874,000	$ -33,860,000	104.7%	114.3%
1996	$ 814,607,000	$ -10,040,000	101.2%	123.2%
1997	$ 915,242,000	$ -42,839,000	104.9%	131.6%
1998	$1,013,320,000	$ -72,666,000	107.7%	132.7%
1999	$1,105,506,000	$ -82,963,000	108.1%	136.8%
2000	$1,182,914,000	$ -91,662,000	108.3%	130.0%

Valuation Year	Actuarial Value of Assets	UAL	Funded Ratio (AVA)	Funded Ratio (MVA)
2001	$1,357,409,000	$ -90,662,000	107.2%	109.8%
2002	$1,448,904,892	$ -30,696,195	102.2%	90.6%
2003	$1,531,287,777	$ 64,449,174	94.5%	99.2%
2004	$1,614,978,665	$ 154,280,040	91.3%	98.5%
2005	$1,727,032,562	$ 208,785,776	89.2%	95.5%
2006	$1,869,700,000	$ 280,221,211	87.0%	92.7%
2007	$2,029,900,000	$ 304,572,352	87.0%	95.0%
2008	$1,821,400,000	$ 689,568,260	72.5%	62.1%
2009	$1,949,000,000	$ 820,600,046	70.4%	58.6%
2010	$2,120,400,000	$ 797,303,776	72.7%	64.0%
2011	$2,130,052,649	$ 918,268,707	69.9%	63.0%
2012	$2,125,700,227	$1,227,593,985	63.4%	64.1%
2013	$2,285,165,972	$1,276,693,084	64.2%	65.3%
2014	$2,471,291,047	$1,260,343,325	66.2%	65.6%
2015	$2,604,472,784	$1,401,917,266	65.0%	60.1%
2016	$2,733,851,661	$1,501,242,285	64.6%	60.3%
2017	$2,913,161,286	$1,604,199,321*	64.8%	64.0%
2018	$3,044,897,691	$1,716,938,594*	64.5%	60.2%
2019	$3,226,099,142	$1,856,528,319*	64.3%	64.7%
2020	$3,487,424,521	$1,817,384,819*	67.0%	68.1%

*UAL excludes additional employer contributions

As shown in the table above, SJCERA's UAL, from 1990 to 2002, ranged between $ -91,662,000 to $ 47,692,000 from year to year. However, beginning in 2003 through 2020, there began a steady increase in the UAL (14 out of 17 years) to a high of $ 1,856,528,319 in 2019.

While this document tracks the evolution of SJCERA's UAL as it has developed since the year 1990, keep in mind that the actuary can only show from one year to the next what the initial impact a given event may have on future liability projections using the assumptions adopted by the SJCERA Board as of that measurement date. It cannot show what specific long-term impact of that same event may be in later years should the initial assumption prove different from actual experience. An example of this was the enhanced benefits agreed to as part of the 2001 settlement agreement for the case of San Joaquin County DSA, et al. v. Board of Retirement Deputy Sheriff's Association (DSA).

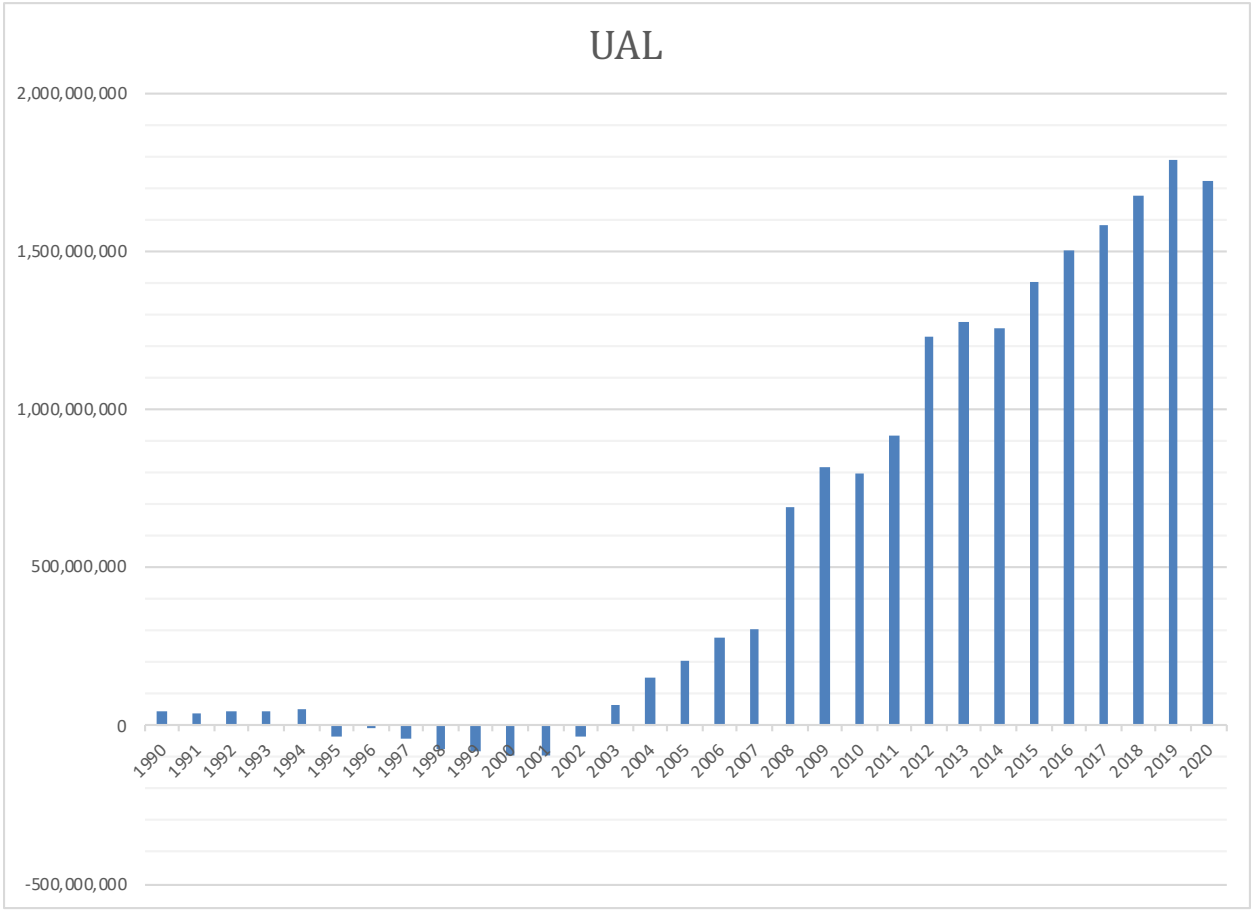
Once the initial event is priced into the cost of the plan, then it is the plan as a whole that gets valued in future years, composed of the many smaller decisions made year after year, and determining the course of the UAL.

YEAR BY YEAR REVIEW

It is typically current history that is of interest to employers, members and the public who want to better understand how the current UAL has evolved over the past decades. In the following pages the data used in calculating the UAL from calendar year 2002 when SJCERA last had a surplus, through 2020, is presented in table format, with commentary on the events of each year that had primary impact on determining if the UAL rose or fell for that given year.

A VISUAL REVIEW OF THE UAL HISTORY

The graph below shows the growth of the UAL in total dollars. By 2003, the benefit enhancements agreed to in the settlement agreement for the case of San Joaquin County DSA, et al. v. Board of Retirement Deputy Sheriff's Association (DSA) and the 2001 tech bubble crash began to negatively impact both SJCERA's funded status and UAL.



CONCLUSION

As this review has shown, both past experience and assumptions (that try to predict the future using that past experience) often change, and have a major impact on the system's future costs. Actuaries use long economic cycles to make their assumptions. They do not often adjust their assumptions in response to year-to-year fluctuations in actual experience. Rather, actuarial assumptions are typically changed only following careful assessment of ongoing and durable trends in experience. Public pension plans, such as SJCERA, take a very long view of the time horizon and are designed specifically to allow time to smooth the effect of the costs associated with the variability of life and its vagaries.

No matter how one looks at the UAL, it's important to keep these points in mind:

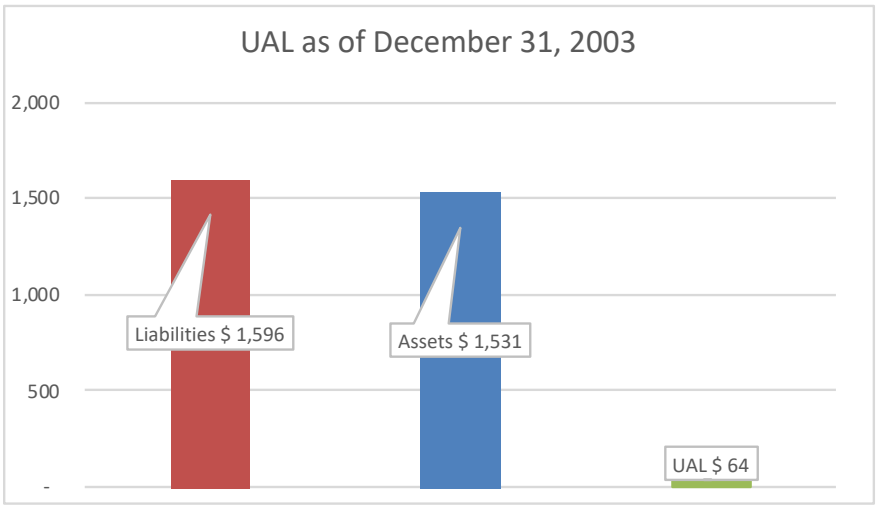
- The UAL is only an estimate based on many different inputs and assumptions that are all subject to refinement
- The UAL is not an absolute number such as the fixed amount of your home mortgage, but is rather a fluid estimate that will both rise and fall as it is revised annually based upon actual experience
- Under a well-structured plan with conservative assumptions, the deviations will be both positive and negative in the short run, but tend to smooth to the actuaries assumed earnings rates over time
- The causes of transitory shortfalls and surpluses will be captured in improved assumptions and appropriate contribution rates over time, ensuring a secure financial foundation for the promises made to San Joaquin County's public servants.

2003

Chart 2003-01

1.	Unfunded actuarial accrued liability as of December 31, 2002		$	(30,696,195)
2.	Change due to contributions:			
	(a) Normal cost	$ 49,735,249		
	(b) Interest on (a)	1,989,410		
	(c) Interest on (1)	(2,504,810)		
	(d) Contributions (member and employer)	45,822,412		
	(e) Interest on (d)	1,832,896		
	(f) Net change: (a)+(b)+(c)-(d)-(e)		$	1,564,541
3.	Expected unfunded actuarial accrued liability: (1)+(2)		$	(29,131,654)
4.	Change due to actuarial experience:			
	(a) Actuarial (gain)/loss from liability sources	$ 47,864,701		
	(b) Actuarial (gain)/loss from asset sources	20,284,588		
	(c) Net change: (a)+(b)			68,149,289
5.	Unfunded actuarial accrued liability before changes: (3)+(4)		$	39,017,635
6.	Change in actuarial assumptions			25,431,539
7.	Change in plan provisions			0
8.	Change in actuarial methods			0
9.	Unfunded actuarial accrued liability as of December 31, 2003: (5)+(6)+(7)+(8)		$	64,449,174

Chart 2003-02



SJCERA experienced an increase in the UAL from $(30,696,195) to $64,449,174 as of January 1, 2004.

CHART 2003-01

Line 4a

Actuarial loss from liabilities (salary growth, turnover, retirement patterns, and service purchases) resulted in an increase in the UAL of $47,864,701.

Line 4b

Actuarial loss from assets is a result of the investment return of of 6.82 percent on an actuarial value basis compared to the actuarial assumption of 8.16 percent, resulted in an increase in the UAL of $20,284,588.

Line 6

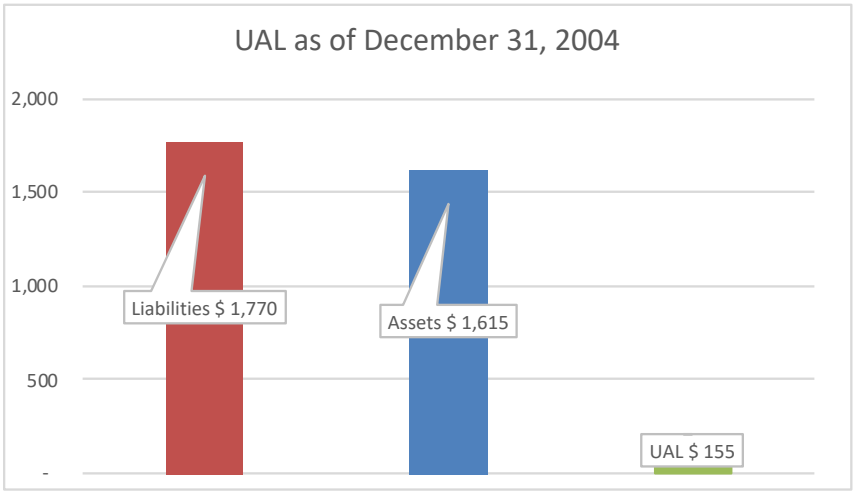
Changes to the actuarial assumptions from the 2003 triannual experience study (retirements, deaths, disabilities) resulted in an increase in the UAL of $25,431,539.

2004

Chart 2004-01

1.	Unfunded actuarial accrued liability as of December 31, 2003		$	89,771,804
2.	Change due to contributions:			
	(a) Normal cost	$ 60,678,066		
	(b) Interest on (a)	2,475,665		
	(c) Interest on (1)	7,325,379		
	(d) Contributions (Member and County)	53,694,111		
	(e) Interest on (d)	2,190,720		
	(f) Net change: (a)+(b)+(c)-(d)-(e)		$	14,594,279
3.	Expected unfunded actuarial accrued liability: (1)+(2)		$	104,366,083
4.	Change due to actuarial experience:			
	(a) Actuarial (gain)/loss from liability sources	$ 14,228,375		
	(b) Actuarial (gain)/loss from asset sources	25,394,041		
	(c) Net change: (a)+(b)			39,622,416
5.	Unfunded actuarial accrued liability before changes: (3)+(4)		$	143,988,499
6.	Change in actuarial assumptions			10,539,541
7.	Change in plan provisions			0
8.	Change in actuarial methods			0
9.	Unfunded actuarial accrued liability as of December 31, 2004: (5)+(6)+(7)+(8)		$	154,528,040

Chart 2004-02



SJCERA experienced an increase in the UAL from $89,771,804 to $154,528,040 as of January 1, 2005. The prior valuation reported an ending UAL balance of $64,449,174, the difference is the differing methodologies from changing actuaries.

CHART 2004-01

Line 4a

Changes due to actuarial experiences (salary growth, turnover, retirement patterns, and service purchases) resulted in an increase in the UAL of $14,228,375.

Line 4b

The actuarial loss from asset sources is a result of the 6.62 percent return on an actuarial value basis compared to the actuarial assumption of 8.16 percent, an increase in the UAL of $25,394,041.

Line 6

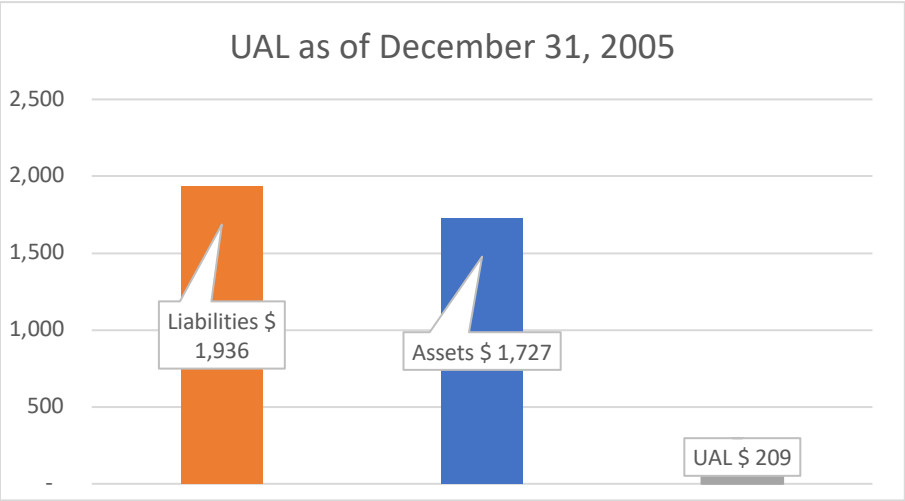
The actuarial change in assumption to the postretirement mortality tables for females resulted in an increase in the UAL of $10,539,541.

2005

Chart 2005-01

1.	Unfunded actuarial accrued liability as of December 31, 2004		$	154,528,040
2.	Change due to contributions:			
	(a) Normal cost	$ 63,268,775		
	(b) Interest on (a)	2,581,366		
	(c) Interest on (1)	12,609,488		
	(d) Contributions (Member and County)	(73,363,413)		
	(e) Interest on (d)	(2,993,227)		
	(f) Net change: (a)+(b)+(c)-(d)-(e)		$	2,102,989
3.	Expected unfunded actuarial accrued liability: (1)+(2)		$	156,631,029
4.	Change due to actuarial experience:			
	(a) Actuarial (gain)/loss from liability sources	$ 13,270,108		
	(b) Actuarial (gain)/loss from asset sources	16,294,819		
	(c) Net change: (a)+(b)			29,564,927
5.	Unfunded actuarial accrued liability before changes: (3)+(4)		$	186,195,956
6.	Change in actuarial assumptions			22,589,820
7.	Change in plan provisions			0
8.	Change in actuarial methods			0
9.	Unfunded actuarial accrued liability as of December 31, 2005: (5)+(6)+(7)+(8)		$	208,785,776

Chart 2005-02



SJCERA experienced an increase in the UAL from $154,528,040 to $208,785,776 as of January 1, 2006.

CHART 2005-01

Line 4a

The actuarial loss from liability (salary growth, turnover, retirement patterns, and service purchases) resulted in an increase in the UAL of $13,270,108.

Line 4b

The actuarial loss from assets is a result of the investment return of 7.2 percent on an actuarial value basis compared to the actuarial assumption of 8.16 percent, an increase in the UAL of $16,294,819.

Line 6

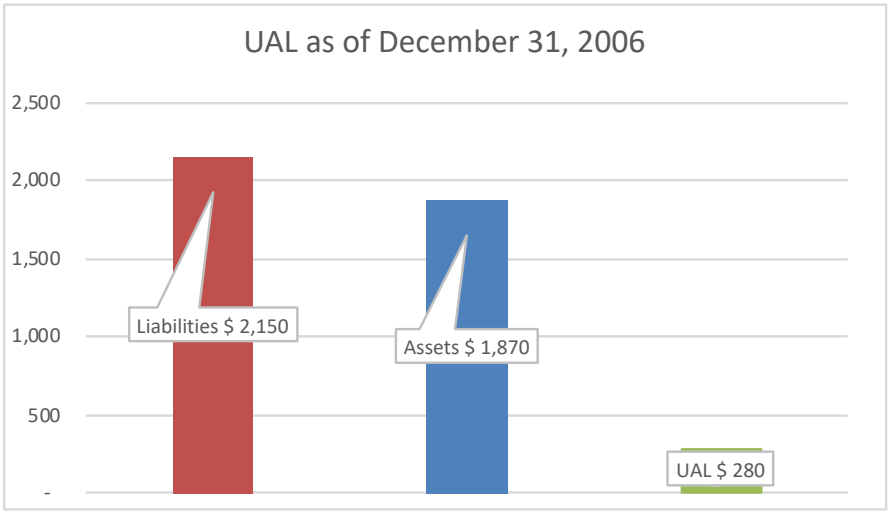
Changes to the postretirement mortality tables for females resulted in an increase in the UAL of $22,589,820.

2006

Chart 2006-01

1.	Unfunded actuarial accrued liability as of December 31, 2005		$ 208,785,775
2.	Change due to contributions:		
	(a) Normal Cost	$ 65,323,145	
	(b) Interest on (a)	2,665,184	
	(c) Interest on (1)	17,036,919	
	(d) Total contributions	(85,627,410)	
	(e) Interest on (d)	(3,493,598)	
	(f) Net change [(a) + (b) + (c) + (d) + (e)]		$ (4,095,760)
3.	Expected unfunded actuarial accrued liability as of December 31, 2006 [(1) + (2)]		$ 204,690,015
4.	Change due to experience:		
	(a) Actuarial (gain)/loss from liabilities	$ 45,829,291	
	(b) Actuarial (gain)/loss from assets	(6,004,689)	
	(c) Net change [(a) + (b)]		$ 39,824,602
5.	Unfunded actuarial accrued liability before changes [(3) + (4)]		$ 244,514,617
6.	Change in actuarial assumptions		(6,567,722)
7.	Change in plan provisions		0
8.	Change in actuarial methods (including selection of new actuary)		42,274,316
9.	Unfunded actuarial accrued liability as of December 31, 2006 [(5) + (6) + (7) + (8)]		$ 280,221,211

Chart 2006-02



SJCERA experienced an increase in the UAL from $208,785,775 to $280,221,211 as of January 1, 2007.

CHART 2006-01

Line 4a

The actuarial liability loss, primarily salary experience (increases in pay among active members was significantly above the assumption) and new entrants entering the plan, resulted in an increase in the UAL of $45,829,291.

Line 4b

The actuarial gain from assets is the investment return on the actuarial value of assets of 9.6 percent compared to the 8.16 assumed rate, a decrease in the UAL of $6,004,689.

Line 6

An experience study for calendar years 2004 through 2006 was conducted and revisions to actuarial assumptions (demographics changes, salary increases, new entrants, and investments) resulted in a decrease in the UAL of $6,567,722.

Line 8

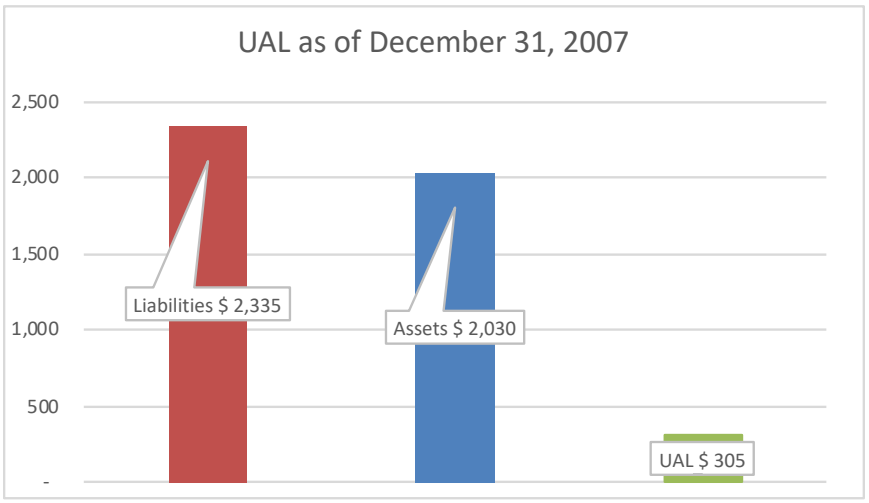
The change in valuation systems and methodologies associated with a new actuary (particularly with respect to estimating and projecting pensionable earnings) increased the UAL by $42,274,316.

2007

Chart 2007-01

1.	Unfunded actuarial accrued liability as of December 31, 2006		280,221,211
2.	Change due to contributions:		
	(a) Normal Cost	67,193,304	
	(b) Interest on (a)	2,741,487	
	(c) Interest on (1)	22,866,051	
	(d) Total contributions	(100,961,450)	
	(e) Interest on (d)	(4,119,227)	
	(f) Net change [(a) + (b) + (c) + (d) + (e)]		(12,279,835)
3.	Expected unfunded actuarial accrued liability as of December 31, 2007 [(1) + (2)]		267,941,376
4.	Change due to experience:		
	(a) Actuarial (gain)/loss from liabilities	39,053,390	
	(b) Actuarial (gain)/loss from assets	(2,422,415)	
	(c) Net change [(a) + (b)]		36,630,975
5.	Unfunded actuarial accrued liability before changes [(3) + (4)]		304,572,352
6.	Change in actuarial assumptions		0
7.	Change in plan provisions		0
8.	Change in actuarial methods		0
9.	Unfunded actuarial accrued liability as of December 31, 2007 [(5) + (6) + (7) + (8)]		304,572,352

Chart 2007-02



SJCERA experienced an increase in the UAL from $280,221,211 to $304,572,352 as of January 1, 2008 due to changes in experience (rates of retirement, disability, termination and death).

CHART 2007-01

Line 4a

The actuarial loss from liabilities, primarily pay increases among active members were well above those anticipated by the actuarial assumptions, in large part to base pay increases and higher levels of supplemental pensionable pay, resulting in an increase in the UAL of $39,053,390.

Line 4b

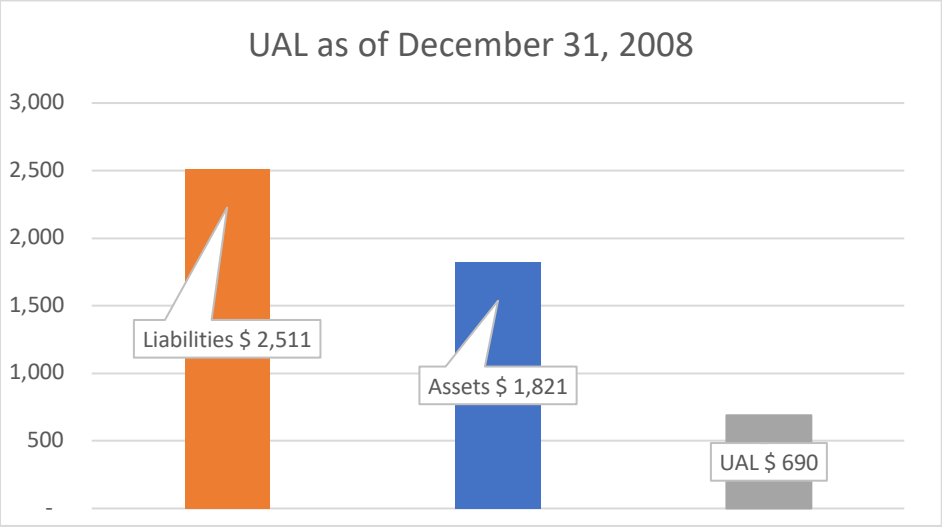
The actuarial gain from assets is the result of the actuarial investment return of 11.3 percent compared to the 8.16 assumed rate, a decrease in the UAL of $2,422,415.

2008

Chart 2008-01

1.	Unfunded actuarial accrued liability as of December 31, 2007		304,572,352
2.	Change due to contributions:		
	(a)Normal Cost	72,915,422	
	(b) Interest on (a)	2,974,949	
	(c)Interest on (1)	24,853,104	
	(d) Total contributions	(111,297,006)	
	(e) Interest on (d)	(4,540,918)	
	(f) Net change [(a) + (b) + (c) + (d) + (e)]		(15,094,449)
3.	Expected unfunded actuarial accrued liability as of December 31, 2008 [(1) + (2)]		289,477,903
4.	Change due to experience:		
	(a)Actuarial (gain)/loss from liabilities	6,491,927	
	(b) Actuarial (gain)/loss from assets	393,598,429	
	(c) Net change [(a) + (b)]		400,090,356
5.	Unfunded actuarial accrued liability before changes [(3) + (4)]		689,568,259
6.	Change in actuarial assumptions		0
7.	Change in plan provisions		0
8.	Change in actuarial methods		0
9.	Unfunded actuarial accrued liability as of December 31, 2008 [(5) + (6) + (7) + (8)]		689,568,260

Chart 2008-02



SJCERA experienced a decrease in the UAL from $304,572,352 to $689,568,260 as of January 1, 2009.

CHART 2008-01

Line 4a

The actuarial loss from liabilities was due to worse than predicted salary experience, resulting in an increase in the UAL of $6,491,927.

Line 4b

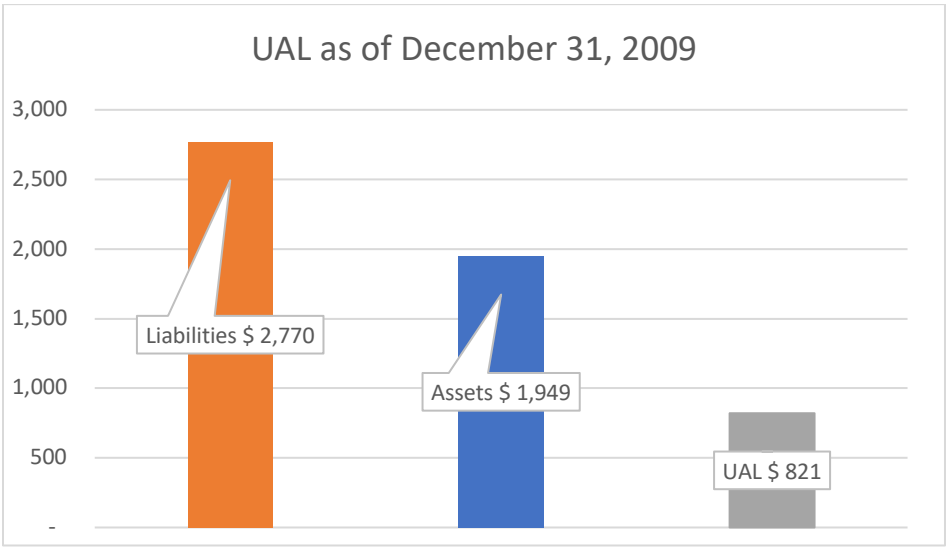
The actuarial loss from assets is a result of the -14.2 percent actuarial rate return, well below the assumed rate of 8.16 percent, an increase in the UAL of $393,598,429.

2009

Chart 2009-01

1.	Unfunded actuarial accrued liability as of December 31, 2008		689,568,260
2.	Change due to contributions:		
	(a)Normal Cost	75,871,269	
	(b) Interest on (a)	6,191,096	
	(c)Interest on (1)	56,268,770	
	(d) Total contributions	(110,818,340)	
	(e) Interest on (d)	(4,521,388)	
	(f) Net change [(a) + (b) + (c) + (d) + (e)]		22,991,407
3.	Expected unfunded actuarial accrued liability as of December 31, 2009 [(1) + (2)]		712,559,666
4.	Change due to experience:		
	(a)Actuarial (gain)/loss from liabilities	(37,638,768)	
	(b) Actuarial (gain)/loss from assets	17,387,452	
	(c)Net change [(a) + (b)]		(20,251,316)
5.	Unfunded actuarial accrued liability before changes [(3) + (4)]		692,308,350
6.	Change in actuarial assumptions		128,291,696
7.	Change in plan provisions		-
8.	Change in actuarial methods		-
9.	Unfunded actuarial accrued liability as of December 31, 2009 [(5) + (6) + (7) + (8)]		820,600,046

Chart 2009-02



SJCERA experienced an increase in the UAL from $689,568,260 to $820,600,046 as of January 1, 2010.

CHART 2009-01

Line 4a

The actuarial gain in liabilities was due to better than predicted demographic experiences (rates of retirement, death, disability and termination), resulting in a decrease in the UAL of $37,638,768.

Line 4b

The actuarial loss from assets is a result of reestablishing the contingency reserve from 0 percent to 3 percent, even though the actuarial rate return of 11.6 percent exceeded the assumption rate return of 7.75 percent, an increase in the UAL of $17,387,452.

Line 6

The change in actuarial assumptions was primarily from updating the mortality rates due in the 2007-2009 Experience Study and lowering of the assumed rate from 8 percent to 7.75 percent. These changes increased the UAL by $128,291,696.

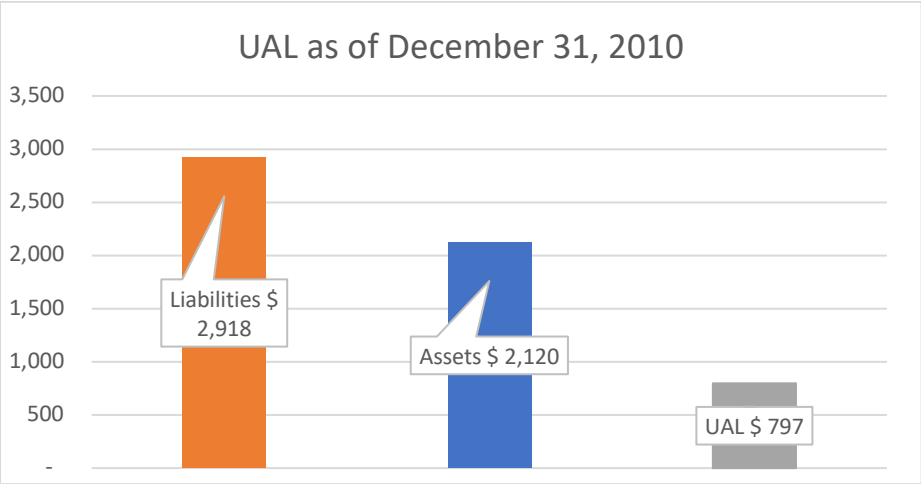
2010

Chart 2010-01

1.	Unfunded actuarial accrued liability as of December 31, 2009		820,600,046
2.	Change due to contributions:		
	(a)Normal Cost	79,989,964	
	(b) Interest on (a)	6,199,222	
	(c)Interest on (1)	63,596,504	
	(d) Total contributions	(117,549,716)	
	(e) Interest on (d)	(4,555,051)	
	(f) Net change [(a) + (b) + (c) + (d) + (e)]		27,680,923
3.	Expected unfunded actuarial accrued liability as of December 31, 2010 [(1) + (2)]		848,280,969
4.	Change due to experience:		
	(a)Actuarial (gain)/loss from liabilities	(29,624,770)	
	(b) Actuarial (gain)/loss from assets	12,501,388	
	(c)Net change [(a) + (b)]		(17,123,382)
5.	Unfunded actuarial accrued liability before changes [(3) + (4)]		831,157,587
6.	Change in actuarial assumptions		-
7.	Change in plan provisions		-
8.	Change in actuarial methods		(33,853,811)[2]
9.	Unfunded actuarial accrued liability as of December 31, 2010 [(5) + (6) + (7) + (8)]		797,303,776

[2] Reflects reduction in Contingency Reserve

Chart 2010-02



SJCERA experienced a decrease in the UAL from $820,600,046 to $797,303,776 as of January 1, 2011.

CHART 2010-01

Line 4a

The actuarial gain from liabilities was due to salaries being lower than expected, a decrease in the UAL of $29,624,770

Line 4b

The actuarial loss on assets is a result of the 6.4 percent actuarial return on investment compared to the 7.75 percent assumption, an increase in the UAL of $12,501,388.

Line 8

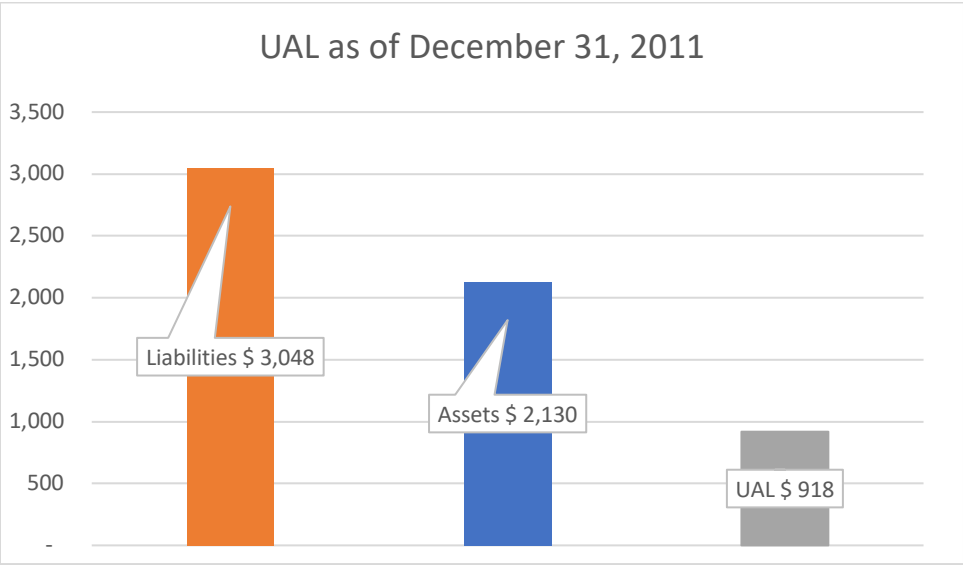
The change in actuarial methods is a result of the contingency reserve being lowered from 3 percent to 1.5 percent, a decrease in the UAL of $33,853,811.

2011

Chart 2011-01

1.	Unfunded actuarial accrued liability as of December 31, 2010		797,303,776
2.	Change due to contributions:		
	(a)Normal Cost	75,402,795	
	(b) Interest on (a)	5,843,717	
	(c)Interest on (1)	61,791,043	
	(d) Total contributions[2]	(126,932,474)	
	(e) Interest on (d)	(4,918,633)	
	(f) Net change [(a) + (b) + (c) + (d) + (e)]		11,186,448
3.	Expected unfunded actuarial accrued liability as of December 31, 2011 [(1) + (2)]		808,490,224
4.	Change due to experience:		
	(a)Actuarial (gain)/loss from liabilities	(31,402,644)	
	(b) Actuarial (gain)/loss from assets	141,181,127	
	(c)Net change [(a) + (b)]		109,778,483
5.	Unfunded actuarial accrued liability before changes [(3) + (4)]		918,268,707
6.	Change in actuarial assumptions		0
7.	Change in plan provisions		0
8.	Change in actuarial methods		0
9.	Unfunded actuarial accrued liability as of December 31, 2011 [(5) + (6) + (7) + (8)]		918,268,707

Chart 2011-02



SJCERA experienced an increase in the UAL from $797,303,776 to $918,268,707 as of January 1, 2012.

CHART 2011-01

Line 4a

The actuarial gain from liabilities was due to better than predicted demographic experience (rates of retirement, death, disability and termination), a decrease in the UAL of $31,402,644.

Line 4b

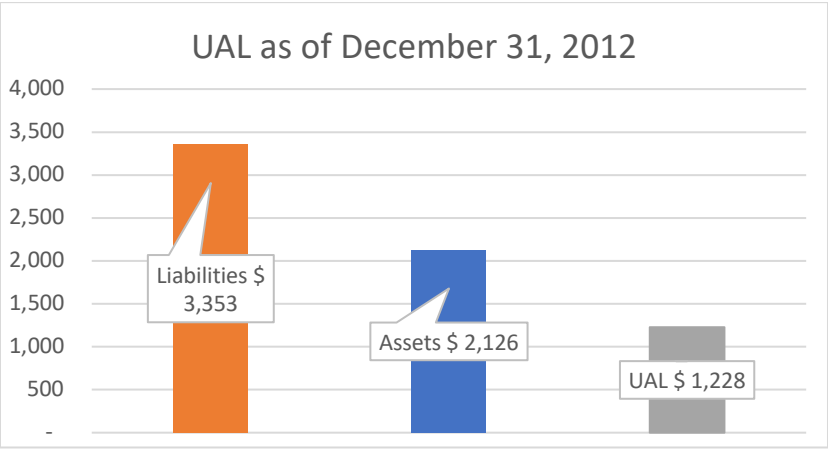
The actuarial loss from asset is a result of the -1.77 percent return on investment compared to the assumed rate of 7.75 percent, an increase in the UAL of $141,181,127.

2012

Chart 2012-01

1. Unfunded Actuarial Liability at Start of Year (not less than zero)	$	918,268,707
2. Employer Normal Cost at Start of Year		73,374,980
3. Interest on 1. and 2. to End of Year		76,852,386
4. Contributions for Prior Year		127,962,598
5. Interest on 4. to End of Year		4,866,030
6. Change in Unfunded Actuarial Liability Due to Changes in Actuarial Methods		3,694,690
7. Change in Unfunded Actuarial Liability Due to Changes in Assumptions		159,894,381
8. Change in Unfunded Actuarial Liability Due to Changes in Plan Design		0
9. Expected Unfunded Actuarial Liability at End of Year [1. + 2. + 3. – 4. – 5. + 6. + 7. + 8.]	$	1,099,256,516
10. Actual Unfunded Actuarial Liability at End of Year (not less than zero)		1,227,593,985
11. Actuarial Gain / (Loss) [9. – 10.] *	$	(128,337,469)

Chart 2012-02



SJCERA experienced an increase in the UAL from $918,268,707 to $1,227,593,985 as of January 1, 2013.

Line 6

The changes in actuarial methods is due to converting from EFI's valuation system to Cheiron's, an increase in the UAL of $3,694,690.

Line 7

The changes due to assumptions is a result of the 2010-2012 experience study as follows:

- Mortality rates changed due to members living longer
- COLA assumption lowered from 2.7 percent to 2.6 percent
- Inflation assumption lowered from 3.25 percent to 3 percent
- Assumption rate lowered from 7.75 percent to 7.5 percent

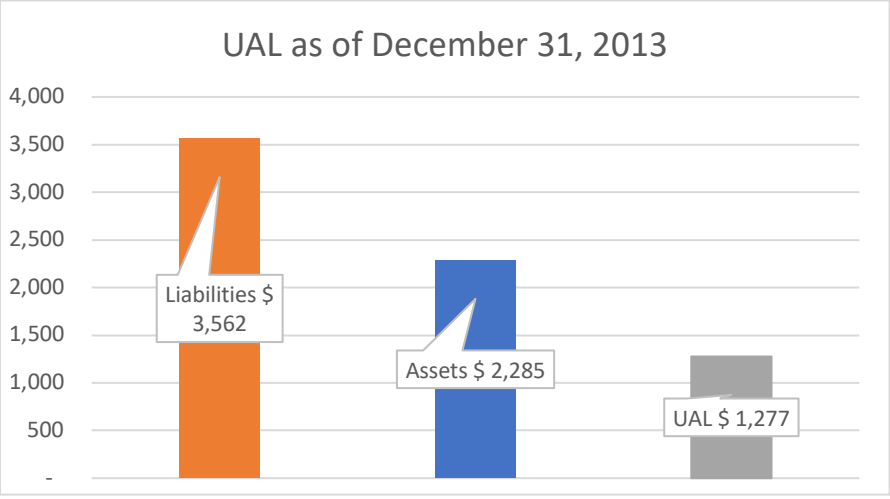
The experience study assumption changes listed above resulted in an increase in the UAL of $159,894,381.

2013

Chart 2013-01

1. Unfunded Actuarial Liability at Start of Year (not less than zero)	$	1,227,593,985
2. Employer Normal Cost at Start of Year		83,842,225
3. Administrative Expense		4,134,716
4. Interest on 1. 2. and 3. to End of Year		98,509,964
5. Contributions for Prior Year		142,184,201
6. Interest on 5. to End of Year		5,235,516
7. Change in Unfunded Actuarial Liability Due to Coding Refinements		50,017,619
8. Expected Unfunded Actuarial Liability at End of Year [1. + 2. + 3. + 4. – 5. – 6. + 7.]	$	1,316,678,792
9. Actual Unfunded Actuarial Liability at End of Year (not less than zero)		1,276,693,084
10. Unfunded Actuarial Liability Gain / (Loss) [8. – 9.]	$	39,985,708
11. Actuarial Liability Gain / (Loss)	$	21,956,197
12. Actuarial Asset Gain / (Loss) [10. – 11.]	$	18,029,511

Chart 2013-02



SJCERA experienced an increase in the UAL from $1,227,593,985 to $1,276,693,084 as of January 1, 2014.

CHART 2013-01

Line 7

The Change in UAL Due to Coding Refinement was a result of coding refinements made to the service timing used in determining entry age for active employees. This was done in order to better conform with new GASB 67/68 standards. Changes were also made to the timing of actual COLA increases and payroll compared to those assumed in the valuation software, resulting in an increase in the UAL of $50,017,619.

Line 11

The Actuarial Liability Gain is a result of favorable salary experience and new members entering the plan compared to actuarial assumptions, a decrease in the UAL of $21,956,197.

Line 12

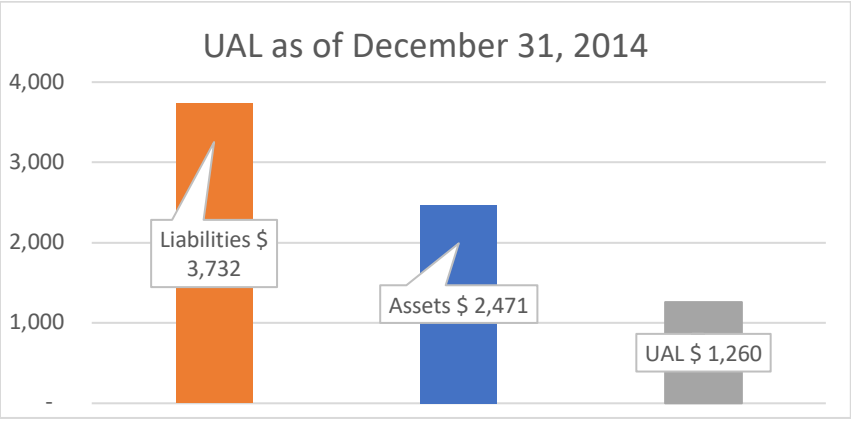
The Actuarial Asset Gain is a result of the actuarial 8.45 percent return on investments compared to the assumed rate of 7.5 percent, a decrease in the UAL of $18,029,511.

2014

Chart 2014-01

1. Unfunded Actuarial Liability at Start of Year (not less than zero)	$	1,276,693,084
2. Employer Normal Cost at Middle of Year		83,470,441
3. Administrative Expense		4,042,986
4. Interest on 1. 2. and 3. to End of Year		98,974,406
5. Contributions for Prior Year		164,054,041
6. Healthcare Fund Transfer		19,968,779
7. Interest on 5. and 6. to End of Year		7,538,467
8. Expected Unfunded Actuarial Liability at End of Year [1. + 2. + 3. + 4. – 5. – 6. + 7.]	$	1,271,619,630
9. Actual Unfunded Actuarial Liability at End of Year (not less than zero)		1,260,343,325
10. Unfunded Actuarial Liability Gain / (Loss) [8. – 9.]	$	11,276,305
11. Actuarial Liability Gain / (Loss)	$	11,929,425
12. Actuarial Asset Gain / (Loss) [10. – 11.]	$	(653,120)

Chart 2014-02



SJCERA experienced a decrease in the UAL from $1,276,693,084 to $1,260,343,325 as of January 1, 2015.

At the July 24, 2015 meeting, the Board chose to make a change to their funding policy, opting to amortize any unexpected changes in the UAL over a period of 15 years as a level percent of pay, with new amortization layers each year. The result is a set of three amortizations bases as of January 1, 2015: the 2008 loss being amortized over 24 years, the remaining UAS as of December 31, 2014 being amortized over 18 years, and new additions to the UAL on or after January 1, 2015, being amortized over 15 years. The single amortization period for these streams of payments is 20 years as of January 1, 2015. The amortization period for each unfunded actuarial liability layer will decrease each year.

CHART 2014-01

Line 11

The Actuarial Liability Gain is a result of the actual pay increases among active members being below the anticipated actuarial assumption, a UAL decrease of $11,929,425.

Line 12

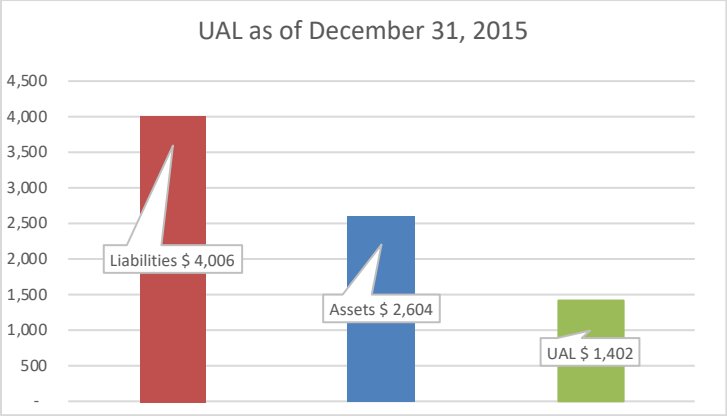
The Actuarial Asset Loss is a result of the actuarial smoothed 7.47 percent return on investments compared to the assumed rate of 7.5 percent, a UAL increase of $653,120.

2015

Chart 2015-01

1. Unfunded Actuarial Liability at Start of Year (not less than zero)	$	1,260,343,325
2. Employer Normal Cost at Middle of Year		84,380,795
3. Administrative Expense		4,075,745
4. Interest on 1. 2. and 3. to End of Year		97,782,903
5. Contributions for Prior Year		179,398,457
6. Healthcare Fund Transfer		378,969
7. Interest on 5. and 6. to End of Year		6,634,245
8. Assumption Changes		91,855,247
9. Expected Unfunded Actuarial Liability at End of Year [1. + 2. + 3. + 4. – 5. – 6. + 7. + 8.]	$	1,352,026,344
10. Actual Unfunded Actuarial Liability at End of Year (not less than zero)		1,401,917,266
11. Unfunded Actuarial Liability Gain / (Loss) [9. – 10.]	$	(49,890,922)
12. Actuarial Liability Gain / (Loss)	$	(3,690,955)
13. Actuarial Asset Gain / (Loss) [11. – 12.]	$	(46,199,967)

Chart 2015-02



SJCERA experienced an increase in the UAL from $1,260,343,325 to $1,401,917,266 as of January 1, 2016.

CHART 2015-01

Line 8

The Assumption Change is a result of updating the demographic and economic assumptions from the 2013-2015 Experience Study, an increase to the UAL of $91,855,247.

Line 12

The Actuarial Liability Loss is a result of unfavorable demographic experiences (rates for death, disability, termination and the retiree COLA), an increase in the UAL of $3,690,955.

Line 13

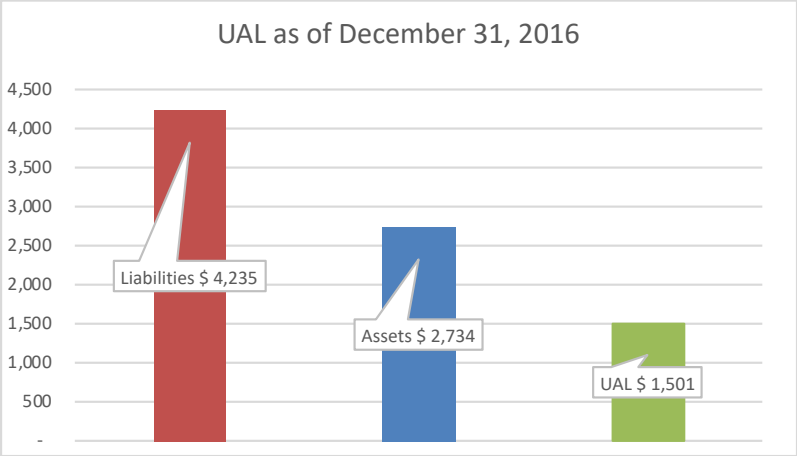
The Actuarial Asset Loss is a result of the actuarial smoothed 5.63 percent return on investments compared to the assumed rate of 7.5 percent, an increase in the UAL of $46,199,967.

2016

Chart 2016-01

1. Unfunded Actuarial Liability at Start of Year (not less than zero)	$	1,401,917,266
2. Employer Normal Cost at Middle of Year		82,861,113
3. Administrative Expense		4,369,744
4. Interest on 1. 2. and 3. to End of Year		110,032,395
5. Contributions for Prior Year		189,239,931
6. Healthcare Fund Transfer		293,779
7. Interest on 5. and 6. to End of Year		6,898,664
8. Assumption Changes		0
9. Expected Unfunded Actuarial Liability at End of Year [1. + 2. + 3. + 4. – 5. – 6. + 7. + 8.]	$	1,402,748,144
10. Actual Unfunded Actuarial Liability at End of Year (not less than zero)		1,501,242,285
11. Unfunded Actuarial Liability Gain / (Loss) [9. – 10.]	$	(98,494,141)
12. Actuarial Liability Gain / (Loss)	$	(45,033,413)
13. Actuarial Asset Gain / (Loss) [11. – 12.]	$	(53,460,728)

Chart 2016-02



SJCERA experienced an increase in the UAL from $1,401,917,266 to $1,501,242,285 as of January 1, 2017.

The Actuarial Value of Assets of $2,733,851,661 is currently 107% of market value at $2,554,802,124. Since actuarial assets are above market assets, there are unrecognized investment losses (approximately $180 million) that will be reflected in the smoothed value in future years.

CHART 2016-01

Line 12

The Actuarial Liability Loss is a result of higher than expected salary growth for General members, an increase in the UAL of $45,033,413.

Line 13

The Actuarial Asset Loss is a result of the actuarial smoothed 5.34 percent return on investments compared to the assumed rate of 7.4 percent, an increase in the UAL of $53,460,728.

2017

Chart 2017-01

1. Unfunded Actuarial Liability at Start of Year (not less than zero)	$	1,501,242,285
2. Middle of year unfunded actuarial liability payment		(123,173,296)
3. Interest to end of year on 1. and 2.		106,615,847
4. Increase in Actuarial Liability due to assumption change		81,854,661
5. Expected UAL at the end of year (1+2+3+4)		1,566,539,497
6. Actual Unfunded Liability at end of year[1]		1,604,199,321
7. Net (Gain)/Loss: (6 - 5)		37,659,824
8. Actuarial Liability (Gain) / Loss	$	(14,692,836)
9. Actuarial Asset (Gain) / Loss	$	48,426,208
10. Contribution Delay (Gain) / Loss	$	3,926,452

[1]Excludes additional County contributions

Chart 2017-02

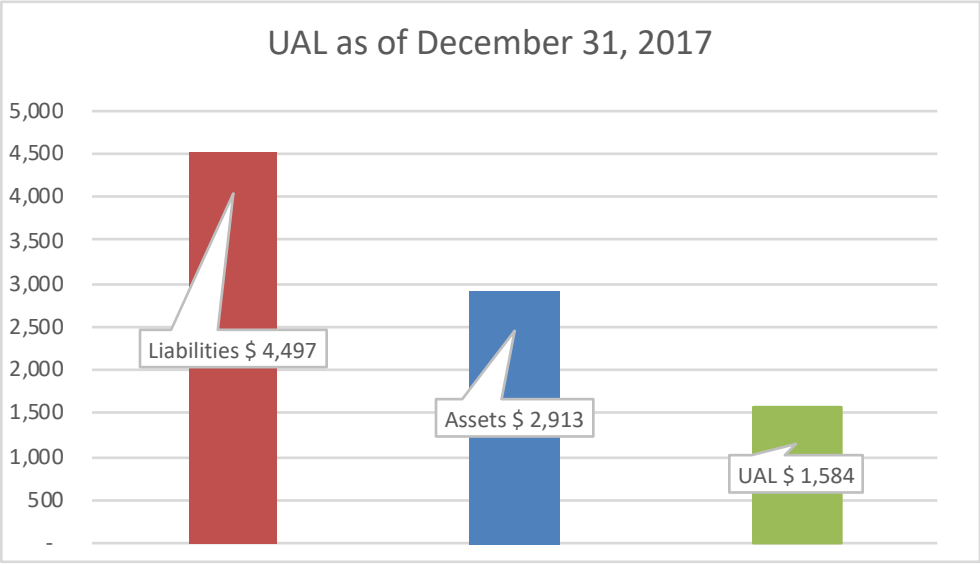


Chart includes additional employer contributions

SJCERA experienced an increase in the UAL from $ 1,501,242,285 to $ 1,604,199,321 as of January 1, 2018, excluding additional employer contributions.

CHART 2017-01

Line 4

The Increase in Actuarial Liability assumption change is a result of the 2017 Board's decision to lower the discount rate from 7.4 percent to 7.25 percent, an increase in the UAL of $81,854,661.

Line 8

The Actuarial Liability Gain is a result of lower than expected salary growth, a decrease in the UAL of $14692,836.

Line 9

The Actuarial Asset Loss is a result of the actuarial smoothed return of 5.64 percent compared to the 7.4 percent assumed rate of return, an increase in the UAL of $48,426,208.

2018

Chart 2018-01

1. Unfunded Actuarial Liability at Start of Year (not less than zero)	$	1,604,199,321
2. Middle of year unfunded actuarial liability payment		(136,458,099)
3. Interest to end of year on 1. and 2.		111,444,392
4. Increase in Actuarial Liability due to assumption change		16,016,526
5. Expected UAL at the end of year (1+2+3+4)		1,595,202,140
6. Actual Unfunded Liability at end of year[1]		1,716,938,594
7. Net (Gain)/Loss: (6 - 5)		121,736,454
8. Actuarial Liability (Gain) / Loss	$	12,744,671
9. Actuarial Asset (Gain) / Loss	$	95,800,416
10. Contribution Delay (Gain) / Loss	$	13,191,367

[1] Assets exclude the additional County and MVCD Contribution Reserves.

Chart 2018-02

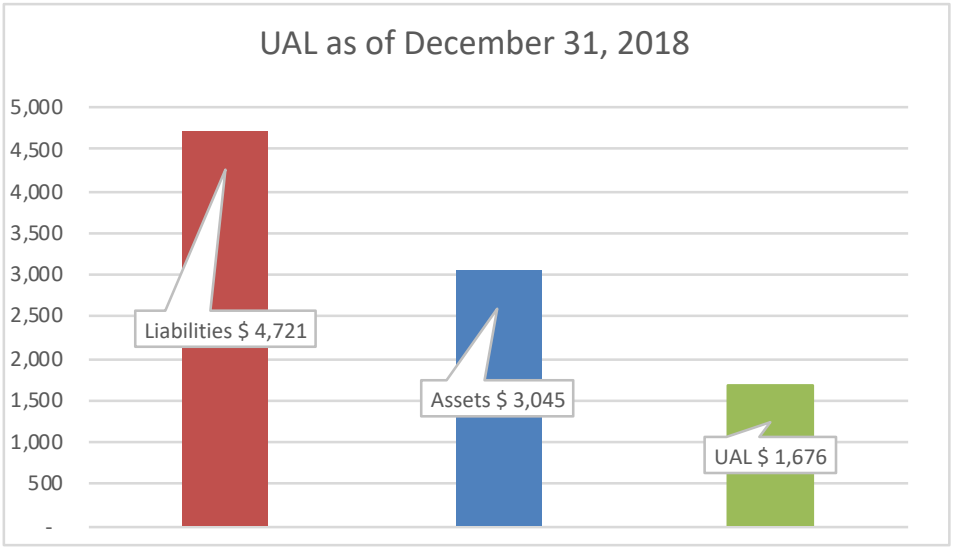


Chart includes additional employer contributions

SJCERA experienced an increase in the UAL from $ 1,583,814,311 to $ 1,676,389,785 as of January 1, 2019, excluding additional employer contributions.

CHART 2018-01

Line 4

The Increase in Actuarial Liability due to assumption change is a result of updating the assumptions from the 2016-2018 Experience study, an increase in the UAL of $16,016,526.

Line 8

The Actuarial Liability Loss is result of higher than expected retiree COLAs, an increase in the UAL of $12,744,671.

Line 9

The Actuarial Asset Loss is a result of the actuarial smoothed return of 3.94 percent compared to the assumed rate of 7.25 percent, an increase in the UAL of $95,800,416.

2019

Chart 2019-01

1. Unfunded Actuarial Liability at Start of Year (not less than zero)	$	1,716,938,594
2. Middle of year unfunded actuarial liability payment		(153,075,201)
3. Interest to end of year on 1. and 2.		119,026,159
4. Increase in Actuarial Liability due to assumption change		135,011,307
5. Expected UAL at the end of year (1+2+3+4)		1,817,900,859
6. Actual Unfunded Liability at end of year[1]		1,856,528,319
7. Net (Gain)/Loss: (6 - 5)		38,627,461
8. Actuarial Liability (Gain) / Loss	$	(49,916,986)
9. Actuarial Asset (Gain) / Loss	$	65,252,333
10. Contribution Delay (Gain) / Loss	$	23,292,114

Chart 2019-02

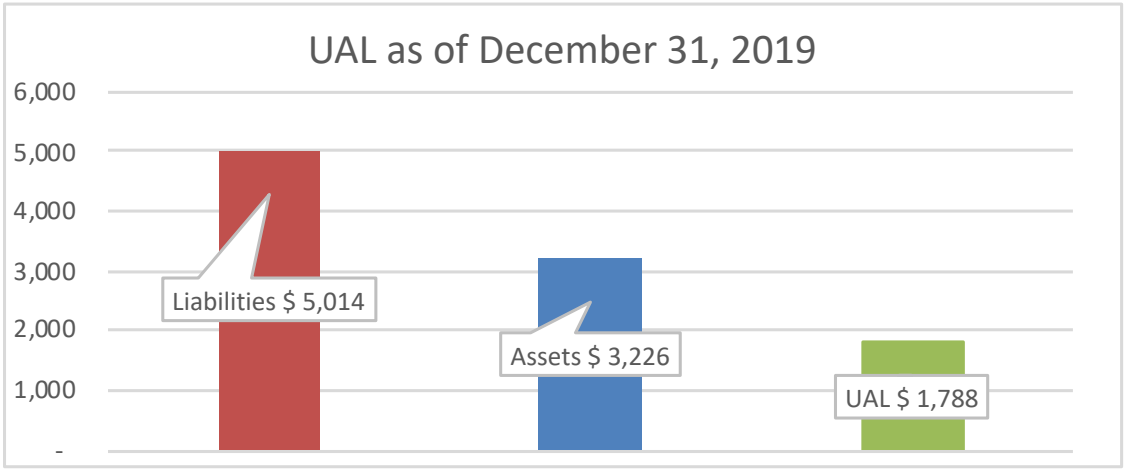


Chart includes additional employer contributions

SJCERA experienced an increase in the UAL from $ 1,716,938,594 to $ 1,856,528,319 as of January 1, 2020, excluding additional employer contributions.

CHART 2019-01

Line 4

The Increase in Actuarial Liability due to assumption change are a result of lowering the assumed rate from 7.25 percent to 7.0 percent and lowering the pay growth assumption from 3.15 percent to 3.0 percent, an increase in the UAL of $135,011,307.

Line 8

The Actuarial Liability Gain is primarily due to lower than expected salary growth, a decrease in the UAL of $49,916,986.

Line 9

The Actuarial Asset Loss is a result of the smoothed return of 5.08 percent compared to the 7.25% assumption, an increase in the UAL of $65,252,333.

2020

Chart 2020-01

	General	Safety	Total
1. Unfunded Actuarial Liability at Start of Year (not less than zero)	$ 1,339,358,650	$ 517,169,670	$ 1,856,528,319
2. Middle of year unfunded actuarial liability payment	(119,284,384)	(45,407,979)	(164,692,363)
3. Interest to end of year on 1. and 2.	89,650,763	34,639,477	124,290,240
4. Increase in Actuarial Liability due to assumption change	0	0	0
5. Expected UAL at the end of year (1+2+3+4)	1,309,725,029	506,401,168	1,816,126,197
6. Actual Unfunded Liability at end of year[1]	1,309,482,987	507,901,832	1,817,384,819
7. Net (Gain)/Loss: (6 - 5)	(242,042)	1,500,664	1,258,622
8. Actuarial Liability (Gain) / Loss	$ (8,724,834)	$ (2,336,016)	$ (11,060,850)
9. Actuarial Asset (Gain) / Loss	$ (5,951,187)	$ (2,848,764)	$ (8,799,951)
10. Contribution (Gain) / Loss	$ 14,433,979	$ 6,685,444	$ 21,119,423

[1] Assets exclude the additional County, MVCD, and Superior Court Contribution Reserves.

Chart 2020-02

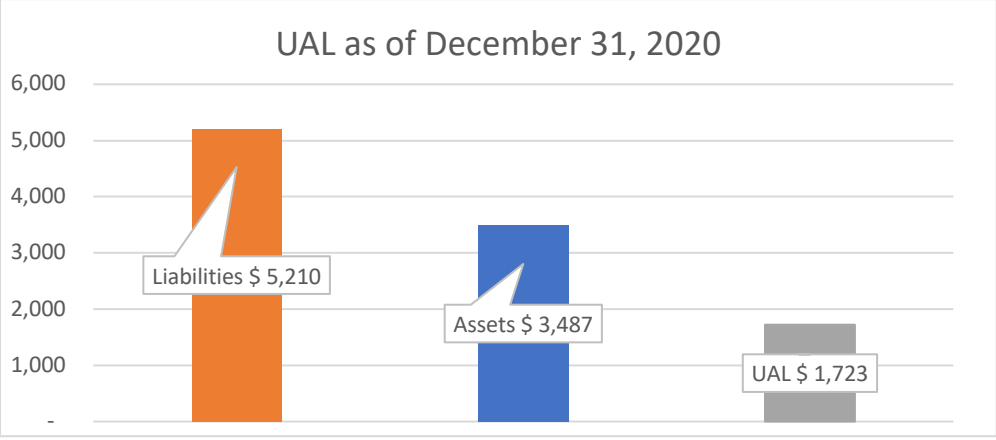


Chart includes additional employer contributions

SJCERA experienced a decrease in the UAL from $ 1,856,528,319 to $ 1,817,384,819 as of January 1, 2021, excluding additional employer contributions.

CHART 2020-01

Line 8

The Actuarial Asset Liability Gain is primarily due to lower than expected salary growth and more deaths than expected, a decrease in the UAL of $11,060,850.

Line 9

The Actuarial Asset Gain is the result of the actuarial smoothed return on assets of 7.28 percent compared to the 7.0 percent assumption, a decrease in the UAL of $8,799,951.

SUMMARY OF HISTORY

The chart below shows the components of the UAL growth over the last ten years, from 2011 through 2020. The primary drivers are the actuarial investment losses of $592.5M and the assumption changes of $494.5M.