**TUCSON SUPPLEMENTAL RETIREMENT SYSTEM**
**BOARD OF TRUSTEES**
**Notice of Regular Meeting / Agenda**

**DATE:** **Thursday, September 26, 2019**
**TIME:** **8:30 a.m.**
**PLACE:** **Human Resource Conference Room, 3rd floor East**
**City Hall, 255 West Alameda**
**Tucson, Arizona 85701**

A. **Consent Agenda**
1. Retirement Ratifications for September 2019
2. August 2019 TSRS Budget Vs. Actual Expenses
3. August 2019 Board Meeting Minutes
4. TSRS August Investment Measurement Services Monthly Review

B. **Call to Audience**

C. **Disability Application***
1. Sheila Osuna

D. **Administrative Discussions**
1. Internal Audit Update
2. Update on Staff Recruitment

E. **Articles & Readings for Board Member Education / Discussion**
1. Commentary: Board Composition Drives Performance in Public Plans
2. GRS Perspectives – Understanding Actuarial Assumptions
3. Why the Fed Lowered Interest Rates AGAIN

F. **Future Agenda Items**

G. **Adjournment**

**Please Note: Legal Action may be taken on any agenda item**

***Pursuant to A.R.S. 38-431.03(A)(3) and (4): the board may hold an executive session for the purposes of obtaining legal advice from an attorney or attorneys for the Board or to consider its position and instruct its attorney(s) in pending or contemplated litigation. The board may also hold an executive session pursuant to A.R.S. 38-431.03(A)(1) for the discussion or consideration of matters specific to an identified public officer, appointee, or employee or pursuant to A.R.S. 38-431.03(A)(2) for purposes of discussion or consideration of records, information or testimony exempt by law from public inspection.

# Ratification Report for TSRS Board of Trustees

**Application Dates: 08/11/19 - 09/10/19** | **Report Date: September 2019**

| Name of Applicant | Type | Retirement Date | Age | Credited Service | Estimated calc or Final calc* | Avg Final Monthly Pay | Option | Pension Amount |
|---|---|---|---|---|---|---|---|---|
| Raymond F Camacho | Normal Retirement | 8/13/2019 | 60.37 | 27.67 | Final | 4,287.73 | J&S 100 | 2,315.93 |
| Carlos R Portillo | Normal Retirement | 8/16/2019 | 57.10 | 22.91 | Final | 4,834.59 | Single Life | 2,492.45 |
| Tim Cox | Normal Retirement | 8/17/2019 | 60.47 | 21.96 | Final | 3,708.63 | J&S 100 | 1,641.05 |
| Eddie M Lopez | Normal Retirement | 8/17/2019 | 52.58 | 27.43 | Final | 4,276.19 | J&S 100 | 2,282.48 |
| Deborah Rainone | Normal Retirement | 9/7/2019 | 64.46 | 31.87 | Estimate | 8,475.96 | J&S 75 | 5,609.29 |

* Calculation of average final monthly pay and pension amount is estimated based on all available data and becomes a final calculation after the applicant has received payment for all accrued leave balances.

Source Material: GRS/Payroll

Prepared By: Dawn M Dale

Reviewed By: Pete Sator

**Report ID** : FIN-COT-BA-0001
**Run Date** : 09/17/2019
**Run Time** : 10:30 AM

# City of Tucson
## Budget vs Actual Expenses
## Through: August, 2020
## For Fiscal Year 2020

### Parameter Page

**Parameters and Prompts**

| | |
|---|---|
| **Fiscal Year** | 2020 |
| **Accounting Period** | 2 |
| **Fund** | 072 |
| **Department** | 900 |
| **Unit** | * |
| **Object Code** | * |

**Report Description**

The Expenses vs. Actual Report shows expenditures and encumbrances for the selected accounting period and for the selected fiscal year compared against the current expense budget and the unobligated budget balance. The report is sectioned by Department, Fund and Unit and summarized by Object.

# City of Tucson
## Budget vs Actual Expenses
## Through: August, 2020
## For Fiscal Year 2020

**Department** 900 - TUCSON SUPPL RETIREMENT SYSTEM
**Fund** 072 - TUCSON SUPP RETIREMENT SYSTEM
**Unit** 9001 - Normal Retiree Benefit

| Object | Current Period Encumbrance | Current Period Expenditure | Current Total Obligations | YTD Encumbrance | YTD Expenditure | YTD Total Obligations | Current Budgeted Amount | Unobligated Budget Balance | Percent |
|---|---|---|---|---|---|---|---|---|---|
| 105 - PAYROLL PENSION | 0.00 | 5,749,115.14 | 5,749,115.14 | 0.00 | 11,482,964.73 | 11,482,964.73 | 71,300,000 | 59,817,035.27 | 83.89 % |
| **Total for 100 - PAYROLL CHGS** | **0.00** | **5,749,115.14** | **5,749,115.14** | **0.00** | **11,482,964.73** | **11,482,964.73** | **71,300,000** | **59,817,035.27** | **83.89 %** |
| **Total for Unit 9001 - Normal Retiree Benefit** | **0.00** | **5,749,115.14** | **5,749,115.14** | **0.00** | **11,482,964.73** | **11,482,964.73** | **71,300,000** | **59,817,035.27** | **83.89 %** |

# City of Tucson
## Budget vs Actual Expenses
## Through: August, 2020
## For Fiscal Year 2020

**Department** 900 - TUCSON SUPPL RETIREMENT SYSTEM
**Fund** 072 - TUCSON SUPP RETIREMENT SYSTEM
**Unit** 9003 - Normal Retiree Beneficiary Benefit

| Object | Current Period Encumbrance | Current Period Expenditure | Current Total Obligations | YTD Encumbrance | YTD Expenditure | YTD Total Obligations | Current Budgeted Amount | Unobligated Budget Balance | Percent |
|---|---|---|---|---|---|---|---|---|---|
| 105 - PAYROLL PENSION | 0.00 | 383,593.28 | 383,593.28 | 0.00 | 755,999.37 | 755,999.37 | 4,600,000 | 3,844,000.63 | 83.57 % |
| **Total for 100 - PAYROLL CHGS** | **0.00** | **383,593.28** | **383,593.28** | **0.00** | **755,999.37** | **755,999.37** | **4,600,000** | **3,844,000.63** | **83.57 %** |
| **Total for Unit 9003 - Normal Retiree Beneficiary Benefit** | **0.00** | **383,593.28** | **383,593.28** | **0.00** | **755,999.37** | **755,999.37** | **4,600,000** | **3,844,000.63** | **83.57 %** |

# City of Tucson
## Budget vs Actual Expenses
## Through: August, 2020
## For Fiscal Year 2020

**Department** 900 - TUCSON SUPPL RETIREMENT SYSTEM
**Fund** 072 - TUCSON SUPP RETIREMENT SYSTEM
**Unit** 9020 - Disability Retiree Benefit

| Object | Current Period Encumbrance | Current Period Expenditure | Current Total Obligations | YTD Encumbrance | YTD Expenditure | YTD Total Obligations | Current Budgeted Amount | Unobligated Budget Balance | Percent |
|---|---|---|---|---|---|---|---|---|---|
| 105 - PAYROLL PENSION | 0.00 | 163,038.69 | 163,038.69 | 0.00 | 327,925.93 | 327,925.93 | 2,100,000 | 1,772,074.07 | 84.38 % |
| **Total for 100 - PAYROLL CHGS** | **0.00** | **163,038.69** | **163,038.69** | **0.00** | **327,925.93** | **327,925.93** | **2,100,000** | **1,772,074.07** | **84.38 %** |
| **Total for Unit 9020 - Disability Retiree Benefit** | **0.00** | **163,038.69** | **163,038.69** | **0.00** | **327,925.93** | **327,925.93** | **2,100,000** | **1,772,074.07** | **84.38 %** |

# City of Tucson
## Budget vs Actual Expenses
## Through: August, 2020
## For Fiscal Year 2020

**Department** 900 - TUCSON SUPPL RETIREMENT SYSTEM
**Fund** 072 - TUCSON SUPP RETIREMENT SYSTEM
**Unit** 9021 - Pension Fund Administration

| Object | Current Period Encumbrance | Current Period Expenditure | Current Total Obligations | YTD Encumbrance | YTD Expenditure | YTD Total Obligations | Current Budgeted Amount | Unobligated Budget Balance | Percent |
|---|---|---|---|---|---|---|---|---|---|
| 101 - SALARIES & WAGES FOR PERMANENT EMPLOYEES | 0.00 | 27,689.20 | 27,689.20 | 0.00 | 40,783.43 | 40,783.43 | 300,770 | 259,986.57 | 86.44 % |
| 108 - DOWNTOWN ALLOWANCE & DISCOUNTED TRANSIT PASSES | 0.00 | 121.17 | 121.17 | 0.00 | 164.04 | 164.04 | 2,700 | 2,535.96 | 93.92 % |
| 113 - TSRS PENSION CONTRIBUTION | 0.00 | 7,545.78 | 7,545.78 | 0.00 | 11,039.36 | 11,039.36 | 82,720 | 71,680.64 | 86.65 % |
| 114 - FICA (SOCIAL SECURITY) | 0.00 | 1,997.61 | 1,997.61 | 0.00 | 2,904.92 | 2,904.92 | 21,680 | 18,775.08 | 86.60 % |
| 115 - WORKERS COMPENSATION INSURANCE | 0.00 | 204.31 | 204.31 | 0.00 | 856.76 | 856.76 | 6,550 | 5,693.24 | 86.92 % |
| 116 - GROUP PLAN INSURANCE | 0.00 | 3,882.25 | 3,882.25 | 0.00 | 6,037.60 | 6,037.60 | 34,840 | 28,802.40 | 82.67 % |
| 196 - INTERDEPARTMENTAL LABOR | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 96,000 | 96,000.00 | 100.00 % |
| **Total for 100 - PAYROLL CHGS** | **0.00** | **41,440.32** | **41,440.32** | **0.00** | **61,786.11** | **61,786.11** | **545,260** | **483,473.89** | **88.67 %** |
| 202 - TRAVEL | 0.00 | 0.00 | 0.00 | 0.00 | 1,110.00 | 1,110.00 | 18,000 | 16,890.00 | 93.83 % |
| 204 - TRAINING | 0.00 | 0.00 | 0.00 | 0.00 | 330.00 | 330.00 | 14,000 | 13,670.00 | 97.64 % |
| 205 - PARKING SERVICE | 0.00 | 56.00 | 56.00 | 0.00 | 123.00 | 123.00 | 500 | 377.00 | 75.40 % |
| 212 - CONSULTANTS AND SURVEYS | 0.00 | (65,000.00) | (65,000.00) | 0.00 | 0.00 | 0.00 | 436,000 | 436,000.00 | 100.00 % |
| 213 - LEGAL | 0.00 | 0.00 | 0.00 | 0.00 | 9,739.50 | 9,739.50 | 50,000 | 40,260.50 | 80.52 % |
| 215 - AUDITING AND BANK SERVICES | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 380,000 | 380,000.00 | 100.00 % |
| 219 - MISCELLANEOUS PROFESSIONAL SERVICES | 0.00 | 1,510.00 | 1,510.00 | 0.00 | 1,520.00 | 1,520.00 | 884,000 | 882,480.00 | 99.83 % |
| 221 - INSUR-PUBLIC LIABILITY | 0.00 | 14.59 | 14.59 | 0.00 | 32.14 | 32.14 | 2,970 | 2,937.86 | 98.92 % |
| 228 - HAZARDOUS WASTE INSURANCE | 0.00 | 246.58 | 246.58 | 0.00 | 254.46 | 254.46 | 660 | 405.54 | 61.45 % |
| 232 - R&M MACHINERY & EQUIPMENT | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1,200 | 1,200.00 | 100.00 % |

# City of Tucson
## Budget vs Actual Expenses
## Through: August, 2020
## For Fiscal Year 2020

**Department** 900 - TUCSON SUPPL RETIREMENT SYSTEM
**Fund** 072 - TUCSON SUPP RETIREMENT SYSTEM
**Unit** 9021 - Pension Fund Administration

| Object | Current Period Encumbrance | Current Period Expenditure | Current Total Obligations | YTD Encumbrance | YTD Expenditure | YTD Total Obligations | Current Budgeted Amount | Unobligated Budget Balance | Percent |
|---|---|---|---|---|---|---|---|---|---|
| 245 - TELEPHONE | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1,200 | 1,200.00 | 100.00 % |
| 260 - COMPUTER SOFTWARE MAINTENANCE AGREEMENTS | 99,486.88 | 0.00 | 99,486.88 | 99,486.88 | 0.00 | 99,486.88 | 51,000 | (48,486.88) | -95.07 % |
| 263 - PUBLIC RELATIONS | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2,560 | 2,560.00 | 100.00 % |
| 264 - INVESTMENT MGT FEES & COMMISSIONS | 0.00 | (115,922.94) | (115,922.94) | 0.00 | 238,960.80 | 238,960.80 | 3,750,000 | 3,511,039.20 | 93.63 % |
| 265 - SECURITIES LENDING (STOCK FEES) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 60,000 | 60,000.00 | 100.00 % |
| 277 - CARRIED INTEREST EXPENSE | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 4,500,000 | 4,500,000.00 | 100.00 % |
| 284 - MEMBERSHIPS AND SUBSCRIPTIONS | 0.00 | 300.00 | 300.00 | 0.00 | 300.00 | 300.00 | 1,500 | 1,200.00 | 80.00 % |
| **Total for 200 - PROF CHARGES** | **99,486.88** | **(178,795.77)** | **(79,308.89)** | **99,486.88** | **252,369.90** | **351,856.78** | **10,153,590** | **9,801,733.22** | **96.53 %** |
| 311 - OFFICE SUPPLIES | 0.00 | 82.95 | 82.95 | 0.00 | 129.73 | 129.73 | 9,000 | 8,870.27 | 98.56 % |
| 312 - PRINTING,PHOTOGRAPHY,REPRODUCTION | 0.00 | 0.00 | 0.00 | 0.00 | 826.13 | 826.13 | 9,000 | 8,173.87 | 90.82 % |
| 314 - POSTAGE | 0.00 | 39.32 | 39.32 | 0.00 | 39.32 | 39.32 | 12,000 | 11,960.68 | 99.67 % |
| 341 - BOOK, PERIODICALS AND RECORDS | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 250 | 250.00 | 100.00 % |
| 345 - FURNISHINGS, EQUIPMENT AND TOOLS < $5,000 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1,000 | 1,000.00 | 100.00 % |
| 346 - COMPUTER EQUIPMENT < $5,000 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1,000 | 1,000.00 | 100.00 % |
| 359 - NON OFFICE SUPPLIES | 0.00 | 0.00 | 0.00 | 0.00 | 92.37 | 92.37 | 0 | (92.37) | 0.00% |
| **Total for 300 - SUPPLIES** | **0.00** | **122.27** | **122.27** | **0.00** | **1,087.55** | **1,087.55** | **32,250** | **31,162.45** | **96.63 %** |
| **Total for Unit 9021 - Pension Fund Administration** | **99,486.88** | **(137,233.18)** | **(37,746.30)** | **99,486.88** | **315,243.56** | **414,730.44** | **10,731,100** | **10,316,369.56** | **96.14 %** |

# City of Tucson
## Budget vs Actual Expenses
## Through: August, 2020
## For Fiscal Year 2020

**Department** 900 - TUCSON SUPPL RETIREMENT SYSTEM
**Fund** 072 - TUCSON SUPP RETIREMENT SYSTEM
**Unit** 9022 - Disability Retiree Beneficiary Benefit

| Object | Current Period Encumbrance | Current Period Expenditure | Current Total Obligations | YTD Encumbrance | YTD Expenditure | YTD Total Obligations | Current Budgeted Amount | Unobligated Budget Balance | Percent |
|---|---|---|---|---|---|---|---|---|---|
| 105 - PAYROLL PENSION | 0.00 | 34,002.33 | 34,002.33 | 0.00 | 68,736.59 | 68,736.59 | 370,000 | 301,263.41 | 81.42 % |
| **Total for 100 - PAYROLL CHGS** | **0.00** | **34,002.33** | **34,002.33** | **0.00** | **68,736.59** | **68,736.59** | **370,000** | **301,263.41** | **81.42 %** |
| **Total for Unit 9022 - Disability Retiree Beneficiary Bene** | **0.00** | **34,002.33** | **34,002.33** | **0.00** | **68,736.59** | **68,736.59** | **370,000** | **301,263.41** | **81.42 %** |

# City of Tucson
## Budget vs Actual Expenses
## Through: August, 2020
## For Fiscal Year 2020

**Department** 900 - TUCSON SUPPL RETIREMENT SYSTEM
**Fund** 072 - TUCSON SUPP RETIREMENT SYSTEM
**Unit** 9023 - ACTIVE MEMBER REFUNDS-CONTRBS

| Object | Current Period Encumbrance | Current Period Expenditure | Current Total Obligations | YTD Encumbrance | YTD Expenditure | YTD Total Obligations | Current Budgeted Amount | Unobligated Budget Balance | Percent |
|---|---|---|---|---|---|---|---|---|---|
| 186 - TSRS REFUNDS | 0.00 | 84,183.42 | 84,183.42 | 0.00 | 174,970.75 | 174,970.75 | 2,736,000 | 2,561,029.25 | 93.60 % |
| **Total for 100 - PAYROLL CHGS** | **0.00** | **84,183.42** | **84,183.42** | **0.00** | **174,970.75** | **174,970.75** | **2,736,000** | **2,561,029.25** | **93.60 %** |
| **Total for Unit 9023 - ACTIVE MEMBER REFUNDS-CON** | **0.00** | **84,183.42** | **84,183.42** | **0.00** | **174,970.75** | **174,970.75** | **2,736,000** | **2,561,029.25** | **93.60 %** |

# City of Tucson
## Budget vs Actual Expenses
## Through: August, 2020
## For Fiscal Year 2020

**Department** 900 - TUCSON SUPPL RETIREMENT SYSTEM
**Fund** 072 - TUCSON SUPP RETIREMENT SYSTEM
**Unit** 9025 - INTEREST ON REFUNDS

| Object | Current Period Encumbrance | Current Period Expenditure | Current Total Obligations | YTD Encumbrance | YTD Expenditure | YTD Total Obligations | Current Budgeted Amount | Unobligated Budget Balance | Percent |
|---|---|---|---|---|---|---|---|---|---|
| 186 - TSRS REFUNDS | 0.00 | 357.01 | 357.01 | 0.00 | 484.79 | 484.79 | 50,000 | 49,515.21 | 99.03 % |
| **Total for 100 - PAYROLL CHGS** | **0.00** | **357.01** | **357.01** | **0.00** | **484.79** | **484.79** | **50,000** | **49,515.21** | **99.03 %** |
| **Total for Unit 9025 - INTEREST ON REFUNDS** | **0.00** | **357.01** | **357.01** | **0.00** | **484.79** | **484.79** | **50,000** | **49,515.21** | **99.03 %** |

# City of Tucson
## Budget vs Actual Expenses
## Through: August, 2020
## For Fiscal Year 2020

**Department** 900 - TUCSON SUPPL RETIREMENT SYSTEM
**Fund** 072 - TUCSON SUPP RETIREMENT SYSTEM
**Unit** 9026 - DWE SYSTEM BENEFIT PAYMENT

| Object | Current Period Encumbrance | Current Period Expenditure | Current Total Obligations | YTD Encumbrance | YTD Expenditure | YTD Total Obligations | Current Budgeted Amount | Unobligated Budget Balance | Percent |
|---|---|---|---|---|---|---|---|---|---|
| 186 - TSRS REFUNDS | 0.00 | 0.00 | 0.00 | 0.00 | 29,829.21 | 29,829.21 | 200,000 | 170,170.79 | 85.09 % |
| **Total for 100 - PAYROLL CHGS** | **0.00** | **0.00** | **0.00** | **0.00** | **29,829.21** | **29,829.21** | **200,000** | **170,170.79** | **85.09 %** |
| **Total for Unit 9026 - DWE SYSTEM BENEFIT PAYMENT** | **0.00** | **0.00** | **0.00** | **0.00** | **29,829.21** | **29,829.21** | **200,000** | **170,170.79** | **85.09 %** |
| **Total for Fund 072 - TUCSON SUPP RETIREMENT SYS** | **99,486.88** | **6,277,056.69** | **6,376,543.57** | **99,486.88** | **13,156,154.93** | **13,255,641.81** | **92,087,100** | **78,831,458.19** | **85.61 %** |
| **Total for Department 900 - TUCSON SUPPL RETIREME** | **99,486.88** | **6,277,056.69** | **6,376,543.57** | **99,486.88** | **13,156,154.93** | **13,255,641.81** | **92,087,100** | **78,831,458.19** | **85.61 %** |
| **Grand Totals** | **99,486.88** | **6,277,056.69** | **6,376,543.57** | **99,486.88** | **13,156,154.93** | **13,255,641.81** | **92,087,100** | **78,831,458.19** | **85.61 %** |

# TUCSON SUPPLEMENTAL RETIREMENT SYSTEM
# BOARD OF TRUSTEES
# MEETING MINUTES

**DATE:** **Monday, August 19, 2019**
**TIME:** **1:30 p.m.**
**PLACE:** **Human Resource Conference Room, 3rd floor East**
**City Hall, 255 West Alameda**
**Tucson, Arizona 85701**

| | |
|---|---|
| Members Present: | Joyce Garland, Finance Director<br>Mark Rubin, Chairman<br>James Wysocki, Elected Retiree Representative<br>Jorge Hernández, Elected Representative<br>Michael Coffey, Elected Representative<br>Kevin Larson, City Manager Appointee |
| Staff Present | Art Cuaron, Pension & Benefits Administrator<br>Tina Gamez, Administrative Assistant |
| Guests Present | Paul Erlendson, Callan LLC |
| Absent/Excused: | Ana Urquijo, HR Director |

Chairman Mark Ruben called the meeting to order at 1:30 pm

A. **Consent Agenda (00:00-00:38)**
1. Retirement Ratifications for July 2019
2. Retirement Ratifications for August 2019
3. June 2019 TSRS Budget Vs. Actual Expenses
4. July 2019 TSRS Budget Vs. Actual Expenses
5. June 2019 Board Meeting Minutes
6. TSRS June Investment Measurement Service Monthly Review
7. TSRS July Investment Measurement Services Monthly Review [Note 1]

**A motion to approve the consent agenda was made by Kevin Larson, 2nd by James Wysocki and passed by a vote of 6 to 0 (Ana Urquijo absent/excused).**

B. **Call to Audience (00:39-00:44)**

**None heard.**

C. **Investment Activity Report**
1. Investment Manager Review – JPMorgan Asset Management – Shawn Parris **(00:45-01:39)**
Art Cuaron informed the Board that the team from JPMorgan was not going to attend the meeting. Their flight from Chicago was delayed several hours and so they are not able to be present. They requested that the Board reschedule and allow them to present at a future meeting.

**No discussion held, no action taken.**

2. TSRS Quarterly Investment Review for 06/30/19 – Callan **(01:40-46:53)**

Paul Erlendson of Callan gave a brief over view of the quarterly investment review. The economic backdrop continues to get more and more uncertain. The Board's strategy was developed knowing that there would be periods of uncertainty.

Paul noted that as of the fiscal year end, the investments have continued to be successful.

- Michael Coffey asked about a recession and whether we can or should attempt to make changes to be more secure.
- Jorge Hernandez asked about the implications of the most recent market volatility.
- Jim Wysocki asked if we need to reexamine any assumptions built into our model.

Paul Erlendson stated that the investment returns have been meeting expectations. In addition, GDP growth peaked in the middle of 2018. The growth in the economy has been more constant. The risk of a recession is clear, and it has been 11 years since our last recession. One problem is that there is less of a premium being paid for investment risk, so the risk of loss can be greater than the potential for gain in general terms. It is possible to gain some value from active management when compared to the passive indexes. Most pensions have spent more time on risk management as well as liquidity due to them being conservatively managed. Pension funds wouldn't suffer because of how capital is being handled, and if there was a recession it would be off a low rate. Compared to other the domestic equities and other public pensions we have done real well. Compared to other pension plans we're an average pension. We would recommend keeping your assets diversified across value and growth stocks to ensure that when the market conditions change, you are well positioned. Interest rates have been very low for a long time and this is a concern for investors.

Paul commented that Aberdeen has been turning around and the results have been closer to benchmark then in the past. Aberdeen has been lagging for a long time, but since there performance has gotten better, Paul suggested we stay with them.

Jim Wysocki asked how Aberdeen would react to upcoming recession.

Paul stated that Aberdeen would typically take a long view, but would say that they're one of our better managers. Over the ten year period the fund has compounded almost 10.2% a year. We gained the performance over our assets verses the actuary assumptions. The last five years we still are ahead of the benchmarks. The last three years we are ahead by almost a full percent and for the last year which included a difficult fourth quarter, we are about seven basis points behind. Our plan has been a success.

Our assets in real estate and infrastructure are difficult to benchmark. We have a good plan, good performance and continue stay on course. We made a good choice to diversify into the infrastructure sector and in addition, we have been fortunate in the timing of our infrastructure investments.

Michael Coffey asked who else we should expect improved performance from, in terms of a potential recession.

Paul commented that Blackrock is a value index fund. They're returns are up to 7.51 over the last 5 years and there benchmark is 7.46 after payment of fees. When compared to T.Rowe Price, their

benchmark is up over 13% and they were up 15% over the last five years. Our value allocation has had less than half of our return due to style allocation. During recession value investments should outperform. Champlain lagged by 90 basis points, but long term, they have done well. Most of the managers have done well, although Causeway has been a disappointment.

Michael Coffey noted that the JP Morgan numbers which were distributed separately from the Callan report look a little different than the Callan report numbers. Paul stated he had not seen this and would look into it.

**Presentation given, no formal action taken.**

3. Final Asset/Liability Model Report – Updated Scenarios – Gordon Weightman – Callan **(46:54-52:45)**

Art Cuaron briefed the Board that this was a follow up from the asset allocation study. The Board started this process back in the beginning of the year. Art is seeking direction from the Board on what mix the Board would like to take, based on the study.

Mark Rubin stated that there had been discussion held earlier and the Board could take action. Jim Wysocki noted that Paul Erlendson had answered his question about whether the asset and liability model should be changed for new assumptions, and no change was needed. Mark Rubin stated that the information at this meeting was consistent with other investment information he has received.

Kevin Larson stated that the review and study of the last 6 months was sufficient and made a motion to approve mix 3 which is consistent with some minor adjustments, 2nd by James Wysocki and passed by a vote of 6 to 0 (Ana Urquijo absent/excused).

**Presentation given, discussion held, approval to adopt mix 3 for an investment strategy.**

4. Infrastructure Allocation **(52:47-01:05:52)**

Art Cuaron informed the Board that they will be moving more funds into real estate. Art stated that there is a closed end fund that has started to liquidate their assets. The distribution will be coming back to TSRS. Michael Coffey asked Paul to present information on the difference between open end and closed end funds. Paul stated that a closed end fund is a commitment for a time, but open ended funds allow an investor to redemptions or make contributions in the fund at your own discretion, while a closed end fund requires the investor to commit to the end of a stated date. Paul stated that there were fewer open end funds when TSRS made its infrastructure investment initially. He stated that liquidation of an open end fund could still take years, but that was more liquid than a closed end fund.

Art Cuaron is seeking direction from the Board if they want to be in an open end or close end fund. Callan recommends if we stay with the infrastructure we should move to an open end fund rather than a close end fund.

**A Motion to direct Callan to proceed with an open end fund and to begin seeking a manager was made by Jorge Hernandez, 2nd by Joyce Garland and passed by a vote of 6 to 0 (Ana Urquijo absent/excused).**

Paul stated that Callan would bring forward multiple complimentary managers and the Board would then have time to review and select their preferred manager or managers. Callan would have some preview of types of managers at the October meeting.

D. **Administrative Discussions**
   1. PRBI Research **(01:05:58-01:14:45)**

Art Cuaron briefed the Board on the PRBI Research. In the packet he provided to the Board was further education as far what other pension plans are currently providing in regards of 13th checks or COLAs. Art stated that this is a follow up from the May's meeting. Art is looking for the Board's thoughts as far as the PRBI Research.

The Board discussed whether it would be beneficial to adjust the policy, eliminate the policy or leave it alone. The Board decided to table the discussion until further notice.

**Discussion held, no formal action taken.**

E. **Articles & Readings for Board Member Education / Discussion**
   1. Sweeping Changes Proposed for NM Pensions
   2. US Yield Curve Sends Strongest Recession Warning Since 2007
   3. Lower Interest Rates Continue to Plague DB Plan Funded Status

F. **Future Agenda Items**
   1. Board Retreat Agenda

G. **Adjournment**

**Meeting Adjourned at 2:47 PM**

| | | | |
|---|---|---|---|
| Mark Rubin | Date | Art Cuaron | Date |
| Chairman of the Board | | Pension & Benefits Administrator | |

Callan

August 31, 2019

# Tucson Supplemental Retirement System

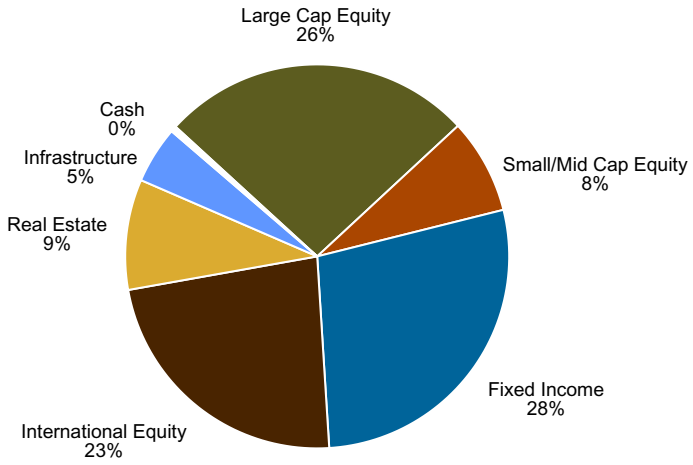
## Investment Measurement Service Monthly Review

## Table of Contents
## Tucson Supplemental Retirement System
## August 31, 2019

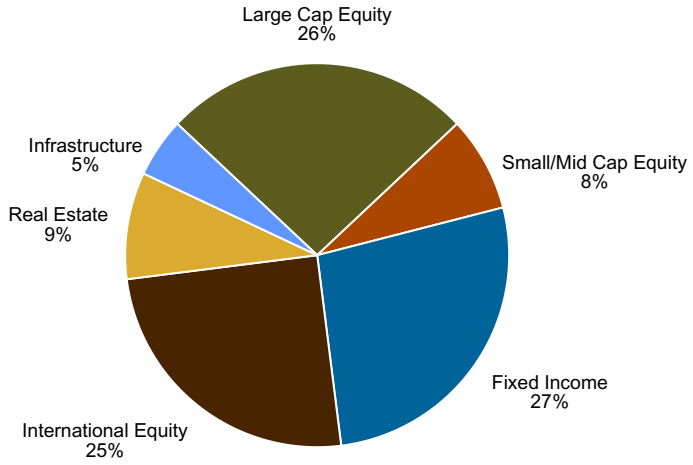
## Actual vs Target Asset Allocation

The first chart below shows the Fund's asset allocation as of August 31, 2019. The second chart shows the Fund's target asset allocation as outlined in the investment policy statement.

### Actual Asset Allocation




### Target Asset Allocation




| Asset Class | $000s Actual | Percent Actual | Percent Target | Percent Difference | $000s Difference |
|---|---|---|---|---|---|
| Large Cap Equity | 218,067 | 26.3% | 26.0% | 0.3% | 2,376 |
| Small/Mid Cap Equity | 66,114 | 8.0% | 8.0% | (0.0%) | (252) |
| Fixed Income | 231,740 | 27.9% | 27.0% | 0.9% | 7,754 |
| International Equity | 192,734 | 23.2% | 25.0% | (1.8%) | (14,661) |
| Real Estate | 77,206 | 9.3% | 9.0% | 0.3% | 2,544 |
| Infrastructure | 39,880 | 4.8% | 5.0% | (0.2%) | (1,599) |
| Cash | 3,838 | 0.5% | 0.0% | 0.5% | 3,838 |
| Total | 829,578 | 100.0% | 100.0% | | |

*Current Month Target Performance is calculated using monthly rebalancing.

## Investment Manager Asset Allocation

The table below contrasts the distribution of assets across the Fund's investment managers as of August 31, 2019, with the distribution as of July 31, 2019. The change in asset distribution is broken down into the dollar change due to Net New Investment and the dollar change due to Investment Return.

### Asset Distribution Across Investment Managers

| | August 31, 2019 | | | | July 31, 2019 | |
|---|---|---|---|---|---|---|
| | Market Value | Weight | Net New Inv. | Inv. Return | Market Value | Weight |
| **Domestic Equity** | **$284,180,774** | **34.26%** | **$(2,425,959)** | **$(8,427,381)** | **$295,034,114** | **35.01%** |
| **Large Cap Equity** | **$218,066,653** | **26.29%** | **$(1,813,504)** | **$(4,699,781)** | **$224,579,938** | **26.65%** |
| Alliance S&P Index | 66,649,246 | 8.03% | (606,250) | (1,066,313) | 68,321,809 | 8.11% |
| PIMCO StocksPLUS | 34,059,173 | 4.11% | 0 | (604,826) | 34,663,999 | 4.11% |
| BlackRock Russell 1000 Value | 58,585,104 | 7.06% | 0 | (1,748,615) | 60,333,719 | 7.16% |
| T. Rowe Price Large Cap Growth | 58,773,130 | 7.08% | (1,207,253) | (1,280,026) | 61,260,410 | 7.27% |
| **Small/Mid Cap Equity** | **$66,114,121** | **7.97%** | **$(612,455)** | **$(3,727,600)** | **$70,454,177** | **8.36%** |
| Champlain Mid Cap | 33,337,246 | 4.02% | (2,243) | (1,626,827) | 34,966,316 | 4.15% |
| Pyramis Small Cap | 32,776,875 | 3.95% | (610,212) | (2,100,773) | 35,487,860 | 4.21% |
| **International Equity** | **$192,733,763** | **23.23%** | **$0** | **$(6,498,603)** | **$199,232,367** | **23.64%** |
| Causeway International Opps | 73,741,349 | 8.89% | 0 | (3,338,732) | 77,080,081 | 9.15% |
| Aberdeen EAFE Plus | 80,527,754 | 9.71% | 0 | (2,193,161) | 82,720,916 | 9.82% |
| American Century Non-US SC | 38,464,660 | 4.64% | 0 | (966,710) | 39,431,370 | 4.68% |
| **Fixed Income** | **$231,740,121** | **27.93%** | **$0** | **$4,284,038** | **$227,456,082** | **26.99%** |
| BlackRock U.S. Debt Fund | 114,862,693 | 13.85% | 0 | 2,909,719 | 111,952,973 | 13.28% |
| PIMCO Fixed Income | 116,877,428 | 14.09% | 0 | 1,374,319 | 115,503,109 | 13.71% |
| **Real Estate** | **$77,205,947** | **9.31%** | **$0** | **$139,103** | **$77,066,844** | **9.14%** |
| JPM Strategic Property Fund | 51,560,981 | 6.22% | 0 | 139,103 | 51,421,878 | 6.10% |
| JPM Income and Growth Fund | 25,644,966 | 3.09% | 0 | 0 | 25,644,966 | 3.04% |
| **Infrastructure** | **$39,879,677** | **4.81%** | **$(179,416)** | **$624,323** | **$39,434,770** | **4.68%** |
| Macquarie European | 12,872,831 | 1.55% | (179,416) | 624,323 | 12,427,923 | 1.47% |
| SteelRiver Infrastructure | 27,006,847 | 3.26% | 0 | 0 | 27,006,847 | 3.20% |
| **Total Cash** | **$3,837,862** | **0.46%** | **$(673,198)** | **$6,992** | **$4,504,068** | **0.53%** |
| Cash | 3,837,862 | 0.46% | (673,198) | 6,992 | 4,504,068 | 0.53% |
| **Total Fund** | **$829,578,144** | **100.0%** | **$(3,278,573)** | **$(9,871,528)** | **$842,728,244** | **100.0%** |

## Investment Manager Returns

The table below details the rates of return for the fund's investment managers over various time periods ended August 31, 2019. Negative returns are shown in red, positive returns in black. Returns for one year or greater are annualized. The first set of returns for each asset class represents the composite returns for all the fund's accounts for that asset class.

### Returns for Periods Ended August 31, 2019

| | Last Month | Year to Date | Last 12 Months | Last 36 Months | Last 60 Months |
|---|---|---|---|---|---|
| **Gross of Fees** | | | | | |
| **Domestic Equity** | **(2.87%)** | **17.16%** | **1.54%** | **13.58%** | **10.69%** |
| Total Domestic Equity Target (1) | (2.16%) | 17.72% | 0.46% | 11.86% | 9.44% |
| **Large Cap Equity** | **(2.10%)** | **17.12%** | **2.41%** | **13.71%** | **10.51%** |
| S&P 500 Index | (1.58%) | 18.34% | 2.92% | 12.70% | 10.11% |
| Alliance S&P Index | (1.57%) | 18.30% | 2.95% | 12.67% | 10.09% |
| S&P 500 Index | (1.58%) | 18.34% | 2.92% | 12.70% | 10.11% |
| PIMCO StocksPLUS | (1.74%) | 19.35% | 2.86% | 12.83% | 10.06% |
| S&P 500 Index | (1.58%) | 18.34% | 2.92% | 12.70% | 10.11% |
| BlackRock Russell 1000 Value | (2.90%) | 13.87% | 0.77% | 8.21% | 6.68% |
| Russell 1000 Value Index | (2.94%) | 13.75% | 0.62% | 8.08% | 6.59% |
| T. Rowe Price Large Cap Growth | (2.05%) | 17.86% | 3.43% | 20.91% | 15.00% |
| Russell 1000 Growth Index | (0.77%) | 23.28% | 4.27% | 17.03% | 13.06% |
| **Small/Mid Cap Equity** | **(5.34%)** | **17.26%** | **(1.13%)** | **13.12%** | **11.33%** |
| Russell 2500 Index | (4.00%) | 15.67% | (7.14%) | 9.04% | 7.06% |
| Champlain Mid Cap | (4.65%) | 17.35% | 4.50% | 16.42% | 13.42% |
| Russell MidCap Index | (2.85%) | 19.57% | 0.54% | 10.05% | 7.94% |
| Pyramis Small Cap | (6.02%) | 17.17% | (7.15%) | 9.57% | 8.99% |
| Russell 2000 Index | (4.94%) | 11.85% | (12.89%) | 7.89% | 6.41% |
| **International Equity** | **(3.25%)** | **9.22%** | **(6.24%)** | **5.62%** | **1.03%** |
| Total International Equity Target (2) | (3.06%) | 8.61% | (4.08%) | 5.71% | 1.26% |
| Causeway International Opps | (4.33%) | 5.48% | (8.27%) | 4.64% | 1.05% |
| MSCI ACWI ex US | (3.09%) | 8.76% | (3.27%) | 5.87% | 1.37% |
| Aberdeen EAFE Plus | (2.65%) | 10.29% | (1.32%) | 5.47% | 0.06% |
| MSCI ACWI x US (Net) | (3.09%) | 8.76% | (3.27%) | 5.87% | 1.37% |
| American Century Non-US SC | (2.37%) | 14.84% | (11.37%) | 8.57% | - |
| MSCI ACWI ex US Small Cap | (2.88%) | 7.66% | (9.01%) | 4.65% | 2.28% |
| **Fixed Income** | **1.88%** | **10.44%** | **11.05%** | **4.75%** | **4.64%** |
| Blmbg Aggregate Index | 2.59% | 9.10% | 10.17% | 3.09% | 3.35% |
| BlackRock U.S. Debt Fund | 2.60% | 9.18% | 10.27% | 3.18% | 3.46% |
| Blmbg Aggregate Index | 2.59% | 9.10% | 10.17% | 3.09% | 3.35% |
| PIMCO Fixed Income | 1.19% | 11.67% | 11.80% | 6.05% | 5.56% |
| Custom Index (3) | 0.62% | 10.02% | 10.18% | 3.71% | 4.10% |

(1) The Total Domestic Equity target is currently composed of 76% S&P 500 and 24% Russell 2500 Index.

(2) The Total International Equity Target reflects the MSCI ACWI ex-US (Net Div) through May 2016 and the MSCI ACWI ex-US IMI (Net Div) thereafter.

(3) The PIMCO custom index is composed of 25% Barclays Mortgage, 25% Barclays Credit, 25% Barclays High Yield, and 25% JP Morgan EMBI Global. Previously the index was composed of 70% Barclays Mortgage, 15% Barclays Credit, and 15% Barclays High Yield.

## Investment Manager Returns

The table below details the rates of return for the fund's investment managers over various time periods ended August 31, 2019. Negative returns are shown in red, positive returns in black. Returns for one year or greater are annualized. The first set of returns for each asset class represents the composite returns for all the fund's accounts for that asset class.

**Returns for Periods Ended August 31, 2019**

| | Last Month | Year to Date | Last 12 Months | Last 36 Months | Last 60 Months |
|---|---|---|---|---|---|
| **Gross of Fees** | | | | | |
| **Real Estate** | **0.18%** | **(1.01%)** | **1.47%** | **5.57%** | **8.26%** |
| NFI-ODCE Value Weight Gr* | 0.33% | 3.11% | 5.65% | 7.32% | 9.44% |
| JPM Strategic Property Fund | 0.27% | (2.21%) | 0.16% | 5.07% | 7.90% |
| JPM Income and Growth Fund** | 0.00% | 1.45% | 4.19% | 6.66% | 9.18% |
| NFI-ODCE Value Weight Gr* | 0.33% | 3.11% | 5.65% | 7.32% | 9.44% |
| **Infrastructure** | **1.59%** | **16.79%** | **26.11%** | **19.23%** | **13.53%** |
| CPI + 4% | 0.28% | 4.80% | 5.54% | 6.12% | 5.34% |
| Macquarie European Infrastructure Fund | 5.09% | 54.18% | 57.25% | 45.35% | 25.03% |
| SteelRiver Infrastructure North Amer.** | 0.00% | 4.57% | 15.27% | 6.21% | 8.38% |
| CPI + 4% | 0.28% | 4.80% | 5.54% | 6.12% | 5.34% |
| **Total Fund** | **(1.17%)** | **11.46%** | **2.99%** | **8.82%** | **7.14%** |
| Total Fund Target | (0.75%) | 11.30% | 2.98% | 7.44% | 6.07% |

* Current Month Target = 27.0% Blmbg Aggregate, 26.0% S&P 500 Index, 25.0% MSCI ACWI ex US IMI, 9.0% NCREIF NFI-ODCE Val Wt Gr, 8.0% Russell 2500 Index and 5.0% CPI-W+4.0%.

*The NFI-ODCE Value Weight benchmark current quarter return is preliminary.

**SteelRiver Infrastructure and JPM I&G performance reflects prior quarter's market values, as current data is not yet available.

## Investment Manager Returns

The table below details the rates of return for the fund's investment managers over various time periods ended August 31, 2019. Negative returns are shown in red, positive returns in black. Returns for one year or greater are annualized. The first set of returns for each asset class represents the composite returns for all the fund's accounts for that asset class.

### Returns for Periods Ended August 31, 2019

| | Last Month | Year to Date | Last 12 Months | Last 36 Months | Last 60 Months |
|---|---|---|---|---|---|
| **Net of Fees** | | | | | |
| **Domestic Equity** | **(2.87%)** | **17.15%** | **1.45%** | **13.32%** | **10.41%** |
| Total Domestic Equity Target (1) | (2.16%) | 17.72% | 0.46% | 11.86% | 9.44% |
| **Large Cap Equity** | **(2.10%)** | **17.11%** | **2.36%** | **13.58%** | **10.38%** |
| S&P 500 Index | (1.58%) | 18.34% | 2.92% | 12.70% | 10.11% |
| Alliance S&P Index | (1.57%) | 18.30% | 2.93% | 12.63% | 10.05% |
| S&P 500 Index | (1.58%) | 18.34% | 2.92% | 12.70% | 10.11% |
| PIMCO StocksPLUS | (1.74%) | 19.35% | 2.86% | 12.83% | 10.06% |
| S&P 500 Index | (1.58%) | 18.34% | 2.92% | 12.70% | 10.11% |
| BlackRock Russell 1000 Value | (2.90%) | 13.83% | 0.73% | 8.17% | 6.65% |
| Russell 1000 Value Index | (2.94%) | 13.75% | 0.62% | 8.08% | 6.59% |
| T. Rowe Price Large Cap Growth | (2.05%) | 17.86% | 3.29% | 20.50% | 14.56% |
| Russell 1000 Growth Index | (0.77%) | 23.28% | 4.27% | 17.03% | 13.06% |
| **Small/Mid Cap Equity** | **(5.34%)** | **17.26%** | **(1.35%)** | **12.45%** | **10.58%** |
| Russell 2500 Index | (4.00%) | 15.67% | (7.14%) | 9.04% | 7.06% |
| Champlain Mid Cap | (4.65%) | 17.35% | 4.27% | 15.67% | 12.59% |
| Russell MidCap Index | (2.85%) | 19.57% | 0.54% | 10.05% | 7.94% |
| Pyramis Small Cap | (6.02%) | 17.17% | (7.35%) | 8.99% | 8.32% |
| Russell 2000 Index | (4.94%) | 11.85% | (12.89%) | 7.89% | 6.41% |
| **International Equity** | **(3.26%)** | **9.04%** | **(6.51%)** | **5.21%** | **0.52%** |
| Total International Equity Target (2) | (3.06%) | 8.61% | (4.08%) | 5.71% | 1.26% |
| Causeway International Opps | (4.33%) | 5.48% | (8.36%) | 4.33% | 0.62% |
| MSCI ACWI ex US | (3.09%) | 8.76% | (3.27%) | 5.87% | 1.37% |
| Aberdeen EAFE Plus | (2.65%) | 10.11% | (1.65%) | 4.89% | (0.59%) |
| MSCI ACWI x US (Net) | (3.09%) | 8.76% | (3.27%) | 5.87% | 1.37% |
| American Century Non-US SC | (2.45%) | 14.12% | (12.21%) | 7.51% | - |
| MSCI ACWI ex US Small Cap | (2.88%) | 7.66% | (9.01%) | 4.65% | 2.28% |
| **Fixed Income** | **1.88%** | **10.43%** | **10.97%** | **4.53%** | **4.38%** |
| Blmbg Aggregate Index | 2.59% | 9.10% | 10.17% | 3.09% | 3.35% |
| BlackRock U.S. Debt Fund | 2.60% | 9.16% | 10.25% | 3.14% | 3.42% |
| Blmbg Aggregate Index | 2.59% | 9.10% | 10.17% | 3.09% | 3.35% |
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(1) The Total Domestic Equity target is currently composed of 76% S&P 500 and 24% Russell 2500 Index.

(2) The Total International Equity Target reflects the MSCI ACWI ex-US (Net Div) through May 2016 and the MSCI ACWI ex-US IMI (Net Div) thereafter.

(3) The PIMCO custom index is currently composed of 25% Barclays Mortgage, 25% Barclays Credit, 25% Barclays High Yield, and 25% JP Morgan EMBI Global. Prior to 2/1/2012, the custom index was composed of 70% Barclays Mortgage, 15% Barclays Credit, and 15% Barclays High Yield.

## Investment Manager Returns

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| | Last Month | Year to Date | Last 12 Months | Last 36 Months | Last 60 Months |
|---|---|---|---|---|---|
| **Net of Fees** | | | | | |
| **Real Estate** | **0.18%** | **(1.19%)** | **0.96%** | **4.70%** | **7.28%** |
| NFI-ODCE Value Weight Gr* | 0.33% | 3.11% | 5.65% | 7.32% | 9.44% |
| JPM Strategic Property Fund | 0.27% | (2.21%) | (0.09%) | 4.27% | 6.99% |
| JPM Income and Growth Fund** | 0.00% | 0.93% | 3.11% | 5.62% | 8.00% |
| NFI-ODCE Value Weight Gr* | 0.33% | 3.11% | 5.65% | 7.32% | 9.44% |
| **Infrastructure** | **1.14%** | **13.19%** | **21.63%** | **13.70%** | **9.96%** |
| CPI + 4% | 0.28% | 4.80% | 5.54% | 6.12% | 5.34% |
| Macquarie European Infrastructure Fund | 3.63% | 37.85% | 39.19% | 28.69% | 15.81% |
| SteelRiver Infrastructure North Amer.** | 0.00% | 4.25% | 14.56% | 5.75% | 7.71% |
| CPI + 4% | 0.28% | 4.80% | 5.54% | 6.12% | 5.34% |
| **Total Fund** | **(1.19%)** | **11.24%** | **2.66%** | **8.21%** | **6.59%** |
| Total Fund Target | (0.75%) | 11.30% | 2.98% | 7.44% | 6.07% |

* Current Month Target = 27.0% Blmbg Aggregate, 26.0% S&P 500 Index, 25.0% MSCI ACWI ex US IMI, 9.0% NCREIF NFI-ODCE Val Wt Gr, 8.0% Russell 2500 Index and 5.0% CPI-W+4.0%.

*The NFI-ODCE Value Weight benchmark current quarter return is preliminary.

**SteelRiver Infrastructure and JPM I&G performance reflects prior quarter's market values, as current data is not yet available.

Pensions&Investments
August 19, 2019 12:00 AM

# Commentary: Board composition drives performance in public plans

Robert Pozen

Robert Pozen

To improve the performance of pension funds, governments should up the percentage of independent public trustees with investment expertise.

Public pension funds underperformed their own return assumptions built into their funding calculations for the fiscal year ended June 30. During this period, state and local pension plans with more than $1 billion in assets earned a median return of 6.79%, as compared to their projected median long-term return of 7.25%, according to the Wilshire Trust Universe Comparison Service.

As a result of lower investment returns together with insufficient contributions by sponsoring governments, public pension plans are facing a funding crisis. State and local pension plans are reporting assets less than 73% of what's needed to meet their projected obligations to pay retirement benefits.

The Federal Reserve has estimated that state and local governments have unfunded accrued pension entitlements of more than $4 trillion.

In an effort to bridge this funding gap, public pension funds have shifted more assets to riskier investments and from traditional bond portfolios. In the year ended June 30, TUCS data show, large public pension plans held a median of 11.5% of their assets in alternative investments such as private equity and another 4.5% of their assets in real estate.

However, a careful study by three distinguished academics has shown that alternative investments by public pension plans systematically underperform if their boards of trustees are dominated by state officials, and to a lesser extent by trustees elected by plan participants. To improve the performance of their pension funds, state and local governments should increase the percentage of independent public trustees with investment expertise.

This study analyzed alternative investments by 212 public pension funds in 3,959 limited partnerships, which raised capital starting in the years 1990 to 2011. Alternative investments were defined to include private equity, venture capital and real estate.

The study focused on alternative investments for several reasons. Over the past decade, public funds have been upping allocations to alternative investments, which typically are organized as private limited partnerships. Due to that format, alternative investments have a low level of transparency so they are particularly vulnerable to political and other non-financial influences. Finally, there is a big difference between the top and bottom performers in each type of alternative investment.

The study divided the boards of public pension plans into multiple categories. The four key categories were: state ex officio (25.4%) — state officials serving due to their government positions; state appointed (7.6%) — state officials appointed by other state officials; participant elected (27%) — generally, current or former employees of the governmental unit; and public appointed (24.6%) — generally, professionals from the local finance industry.

The study found that three of the four key categories of board trustees were significantly correlated with a lower net internal rate of return on the fund's alternative investments. The one bright spot was the category of public appointed trustees. In specific, the study found that:

- A 10% increase in the portion of state-appointed board members was significantly associated with almost a 1% lower annual IRR on fund alternative investments.
- A 10% increase in the portion of state-ex officio board members was significantly associated with over a half of a percent lower annual IRR on fund alternative investments.
- A 10% increase in the portion of participant-elected members was significantly associated with over a quarter of a percent lower annual IRR on fund alternative investments.

What factors explained the underperformance of public pension funds with a high portion of trustees who are state officials, either ex-officio or appointed by other state officials?

Most importantly, such pension funds tend to overweight in-state investments — which provide support to local economic development, but deliver lower returns than other investments of comparable risk. Such pension funds also tend to invest in partnerships of smaller size, managed by less experienced general partners.

In addition, political contributions from the finance industry were a significant cause of underperformance for public pension funds with a high portion of trustees who were state officials. For example, for every $100,000 in political contributions from the finance industry, pension funds experienced a worse net IRR of 0.28%. Those contributions seem to have adversely affected the choice of alternative investments by such boards.

By contrast, less financial expertise explained most of the underperformance for public pension funds with a relatively high percentage of trustees elected by plan participants.

Most of these trustees held non-financial jobs in the relevant governmental unit, such as teachers or firefighters. This explanation is supported by other **studies** concluding that low financial expertise of board trustees is associated with weak pension fund performance.

In short, the governance structure of a public pension fund is a critical driver of its financial returns, especially its choice of alternative investments. More politically connected trustees tend to favor investments attractive to local constituencies, even if such investments have subpar financial performance. To improve the annual returns of public pensions, state and local governments should recruit more trustees who are independent of these governments and familiar with institutional investing.

*Robert Pozen is a senior lecturer at the MIT Sloan School of Management, Cambridge, Mass., and former president of* ***Fidelity Investments***.

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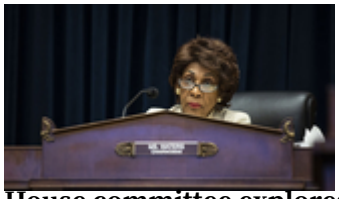

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JANUARY 2019

GRS PERSPECTIVES

# Understanding Actuarial Assumptions

## Brian Murphy

Most public defined benefit retirement plans engage an actuary to perform an annual actuarial valuation. The actuarial valuation presents the plan's funding requirements calculated in accordance with the plan's funding policy. Performing an actuarial valuation is a complex process which involves extensive data requirements and various assumptions. In order to fund pension benefits, several projections about future events are developed based on "actuarial assumptions." The selection of those assumptions is a critical part of the actuarial valuation process. Properly chosen assumptions can help stakeholders understand the plan's financial condition and can help to ensure future sustainability.

In order to perform the valuation, the actuary needs data regarding the following:

Retired and non-retired plan participants;
Retirement plan provisions; and
Retirement plan assets.

The actuary produces the actuarial valuation using computer programs and specialized actuarial techniques that apply assumptions about the future to the above data. The results of the actuarial work include measurements of the plan's funded status, its future contribution needs, and other typical actuarial information. In addition, the actuary usually provides the actuarial portion of information needed for financial reporting.

## What Are Actuarial Assumptions?

There are two broad categories of actuarial assumptions:

1. **Demographic assumptions** which are related to a pension plan's membership such as future rates of retirement, turnover, disability and death before and after retirement; and
2. **Economic assumptions** which are related to other factors such as future rates of investment return, inflation, payroll growth, and pay increases among individual plan participants.

The actuary also makes other more minor assumptions including, but not limited to: rates of marriage, rates of benefit option elections, etc.

## How Are Actuarial Assumptions Determined?

It is important that assumptions be carefully chosen and continually monitored because the choice of assumptions can have a dramatic effect on the results of the valuation and, therefore, on the funding of the plan. The assumption selection process is guided by certain Actuarial Standards of Practice or "ASOPs."

- **ASOP No. 35** (*Selection of Demographic and Other Noneconomic Assumptions for Measuring Pension Obligations*) governs the selection of demographic assumptions;
- **ASOP No. 27** (*Selection of Economic Assumptions for Measuring Pension Obligations*) governs the selection of economic assumptions; and

- **ASOP No. 4** (*Measuring Pension Obligations and Determining Pension Plan Costs or Contributions*) is a general standard covering the measurement of pension obligations.

All of these ASOPs are being revised at the time of this writing. Information regarding the Actuarial Standards of Practice can be found at: http://www.actuarialstandardsboard.org/standards-of-practice/

Someone once jokingly said that actuaries are like race car drivers who steer by looking in the rear view mirror, implying that actuarial assumptions are based solely on past behavior projected into the future. That is not true, though. Actuarial assumptions are intended to be forward-looking estimates of expectations for future behavior, and their development must reflect that intention. It is true that actuaries consider historical information when developing actuarial assumptions, but they also consider current trends, external conditions, and future projections.

For a public pension plan, an actuary may perform an actuarial experience study to review the differences between the plan's assumed and actual experience over multiple years. The study can help analyze related trends and can serve as the basis for recommending assumption changes, if necessary.


## What Is an Experience Study?

An "Experience Study" is the process by which actuaries develop new assumptions or adjust existing assumptions. The studies are based upon a review of data, emerging trends, and future expectations. Experience studies are typically performed every three to five years, although some plans (particularly smaller plans) may perform them less frequently. Actuarial standards require that the actuarial assumptions used in a valuation be reasonable at the time the valuation is performed. The shorter the period between experience studies, the less likely it is that the actuary will need to modify assumptions between studies.

## How Are Demographic Assumptions Developed?

When developing demographic assumptions, the actuary first tallies up rates of retirement, death, disability, turnover, etc. that occurred during the "experience period." Commonly, the experience period is a three- or five-year period preceding the experience study, as discussed above. Initial "crude" rates may be tallied by age, service, gender, occupation, etc. In the past, actuaries usually tallied rates in terms of pure headcounts of people. For example, the actuary would develop a ratio consisting of the number of people age 40 who terminated employment divided by the total number of people age 40. That ratio would be called "the crude rate of employment termination at age 40."

Some actuaries today use a "liability weighted" approach to assumption development. With a liability weighted approach, the crude rate of termination at age 40 would be calculated as the ratio of the liabilities of the 40-year-olds who quit divided by the total liabilities of all 40-year-olds. The approach can make a difference because the total liability of people who quit, die, retire, or become disabled may affect the plan's finances to a greater degree than the number of people who do so. If a person with a liability of $100,000 quits, that has a much larger effect on the

plan than if a different person with a liability of $25,000 quits. Using liability weighting instead of headcount ratios takes that different effect into account.

The actuary may also review observed rates for similar groups, rates that were observed for the group in question in prior studies, or so called "standard tables." In some cases, there are also external conditions that are relevant and may need further consideration, such as:

- Is a recession exerting a short-term effect on turnover rates?
- Is there an impending curtailment of a retiree health care plan that may affect retirement rates?

An experience study will usually result in adjusted rates of retirement, turnover, disability, mortality, etc. to be used in future valuations.

## Mortality

Mortality rates and, in particular, mortality rates after retirement have received increased attention in recent years, arguably because liabilities today are much more heavily weighted toward retirees than they were in the past. For example, it is not uncommon for close to 60% of a plan's liabilities to be liabilities for current retirees and beneficiaries. Such a ratio would have been rare 30 years ago.

It is well known that mortality rates have been declining, or in other words, life expectancies have been increasing for many years. Increasing life expectancy is a very important trend, and one that actuaries cannot overlook, particularly as plans mature and the number of retirees increases relative to the number of active members. In the past, actuaries would account for this trend by assuming mortality rates that are somewhat lower than those observed in the experience study, but that would not be assumed to improve from that point. Today, the practice is shifting toward the use of "fully generational" mortality tables. In a fully generational mortality table, the mortality rates for a person depend on the person's year of birth, age and gender.

The following chart was developed based upon the RP-2014 (Total Dataset adjusted back to 2006) mortality table and the MP-2018 projection scale, both of which were produced by the Society of Actuaries.

**Chart 1**

| | Years of Future Life Expectancy of a 65-Year-Old | | | | |
|---|---|---|---|---|---|
| **Year of Birth** | **1955** | **1965** | **1975** | **1985** | **1995** |
| **Year Turn Age 65** | **2020** | **2030** | **2040** | **2050** | **2060** |
| **Male** | 20.74 | 21.54 | 22.38 | 23.21 | 24.04 |
| **Female** | 22.74 | 23.52 | 24.34 | 25.15 | 25.95 |

Notice that life expectancy at age 65 increases by a little less than a year for each later decade of birth. The chart indicates that a male born in 1955 will have a life expectancy at age 65 (in 2020) of 20.74 years. A male born 10 years later will have a life expectancy at age 65 of 21.54 years. Female life expectancies at age 65 are approximately two years greater than male life expectancies for all illustrated years of birth. If the table is correct, and that will only be known about 100 years from now, the need for the fully generational technique is clear. An actuary who bases the mortality assumption solely on the life expectancy of people born in 1955 would be understating plan liabilities for younger people by 10% or so.

Many plans are too small to develop a mortality table based solely on plan experience. The practice in such plans is to base mortality assumptions heavily on standard tables with standard projection scales, such as illustrated above. Depending on the size of the plan, there may be a "credibility" adjustment that takes into account a portion of the plan's mortality experience.

## How Are Economic Assumptions Developed?

When developing economic assumptions, the actuary may start by looking at the past, but the actuary knows that past performance is not indicative of future results. Consequently, the actuary will also look to estimates of future economic conditions inherent in current market data, expert opinions, investment consultant expectations, etc.

### Inflation

An inflation assumption usually forms the foundation for the development of other economic assumptions. Bond investors, for example, expect yields that at least offset inflation and that provide some real return. Workers expect wages to increase at least as fast as prices, and hopefully faster.

When developing an inflation assumption, actuaries consider various forward-looking expectations, such as those developed by the Congressional Budget Office, the Quarterly Survey of Professional Forecasters, various Federal Reserve Banks, the excess yield of non-indexed Treasuries over indexed Treasures, the Social Security Trustees Report, etc. At the time of this writing, those forecasts are primarily in the 2% to 2.5% range. The 2018 Social Security Trustees Report provides a range for the inflation assumption from 2% to 3.2%, with an intermediate expectation of 2.6%.

### Payroll Growth

In the late 1970s, prices rose faster than payroll, but historical statistics show that payroll increases tend to outpace price increases in the range of about 0.5% to 1.0%, on average. While most people expect a positive relationship between the two rates to continue, the amount by which it may do so is uncertain. The 2018 Social Security Trustees Report provides a range of about 0.6% to 1.8% for the difference, with an intermediate assumption of 1.2%. This assumption is important in plans that use level percent-of-payroll funding of unfunded actuarial accrued liabilities.

### Investment Return

Today, almost all of the attention is on the assumed rate of investment return, but we could not really discuss investment return without considering inflation and payroll growth first. Typically, the investment return assumption contains two components: 1) inflation (defined above); and 2) the real rate of return. The real rate of return is the return on investment after adjusting for inflation. The total of these two components is known as the nominal return rate.

On the following page, Chart 2 gives approximate return information over various time periods on a sample portfolio that is invested with 60% in common stock, 15% in corporate bonds, 15% in government bonds and 10% in Treasury Bills (T-Bills).

Focusing only on the total column, and looking only at the past, it would be easy to say that the top half of the chart provides support for a return assumption in the 8% area, particularly if the 30+ year time horizons are considered. However, when looking at the bottom half of the chart, it appears that the longer term returns were influenced by extraordinary returns for the 1980s and 1990s (the period during which the baby boomers became a significant driving force in the economy) which may or may not recur. Is it wise to fund a retirement plan by assuming that the 1990s will happen again? On the other hand, the bottom half of the chart also includes the influence of the tech bubble in the early 2000s and the 2008 financial crisis as well as the high inflation environment of the 1970s. Will any of those happen again?

Because of the historical volatility of investment return, it is particularly important to consider forward-looking expectations of professional investment consulting firms when developing the investment return assumption. For the most common asset allocations

| Chart 2 | | | | |
|---|---|---|---|---|
| | Portfolio Return | | | Risk Free Rate |
| Time Period | Total[1] | Inflation Portion | Real Portion | (T-Bills) |
| **Returns for Long Periods** | | | | |
| 2008-2017 | 8.1% | 1.6% | 6.4% | 0.30% |
| 1998-2017 | 7.3% | 2.1% | 5.1% | 1.90% |
| 1988-2017 | 9.8% | 2.6% | 7.0% | 3.10% |
| 1978-2017 | 10.6% | 3.5% | 6.9% | 4.60% |
| 1968-2017 | 9.4% | 4.0% | 5.2% | 4.80% |
| **Returns by 10-Year Periods** | | | | |
| 2008-2017 | 8.1% | 1.6% | 6.4% | 0.30% |
| 1998-2007 | 6.5% | 2.7% | 3.7% | 3.50% |
| 1988-1997 | 14.8% | 3.4% | 11.0% | 5.40% |
| 1978-1987 | 13.2% | 6.4% | 6.4% | 9.20% |
| 1968-1977 | 4.7% | 6.2% | -1.4% | 5.70% |

today, most of those firms would be looking for 10- to 20-year returns ranging from 6.5% to 7.5%. The returns at the upper end of the spectrum would require a more aggressive asset allocation than those at the lower end. In response to the current investment environment, many public funds have lowered their return expectations. According to the most recent National Association of State Retirement Administrators (NASRA) Public Fund Survey, the median investment return expectation that was 8% a decade ago is below 7.5% today.[2]

## Conclusion

Actuarial assumptions are intended to be forward-looking expectations of future results, not just rote extrapolations of the past into the future. The experience study is the process by which those assumptions are selected. Currently, the experience study process is becoming much more exacting than it was in the past, possibly in response to plan liabilities being much larger and much more heavily weighted toward retirees than they were previously. At the same time, actuarial standards are being tightened.

Further, liability weighting for demographic assumptions and fully generational versions of mortality tables are becoming more common today than they were in the past. Economic assumptions are being heavily affected by the current low interest rate/ low inflation rate environment, leading many plans to reduce their investment return assumption.

Reasonable actuarial assumptions are very important for a plan's well-being. Out-of-date assumptions are of questionable validity and can potentially do great harm to a plan, causing decisions about the future to be based on out-of-date expectations. If your plan has not had an experience study recently, or if you are concerned about the validity of the assumptions, discuss them with your actuary. It matters.

[1]Typically, the inflation portion and the real portion of the return do not add to the total, especially when inflation is high. As an example, in the first row, the formula for the real portion is 1.081/1.016=1.064 or 6.4% real return.

[2]https://www.nasra.org/publicfundsurvey

## About the Author

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## About GRS

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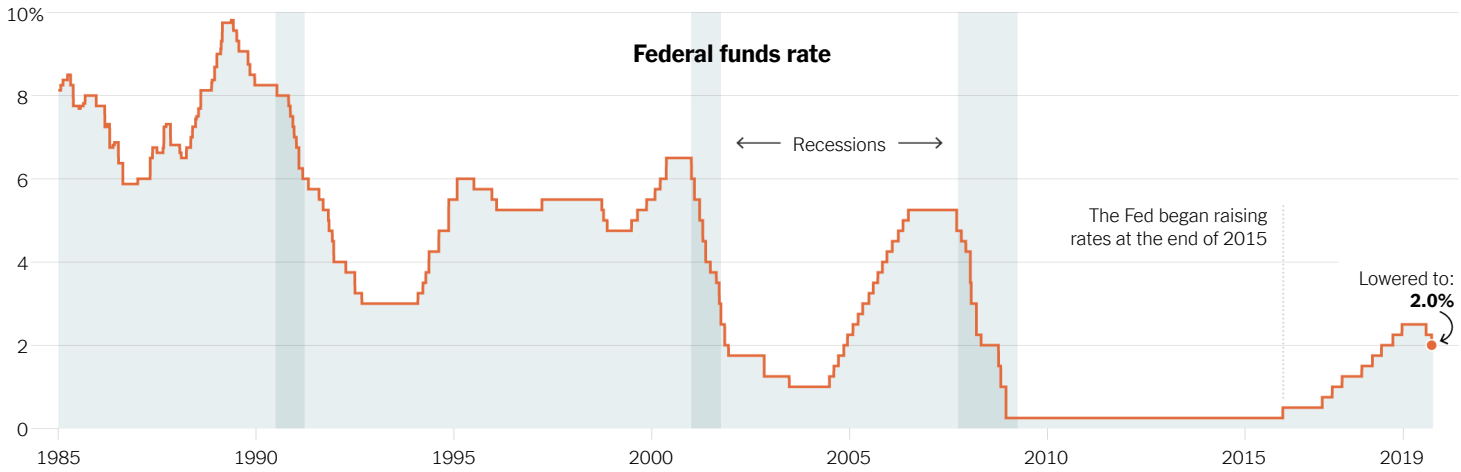
The New York Times

# Why the Fed Lowered Interest Rates Again

By Karl Russell and Jeanna Smialek Sept. 18, 2019

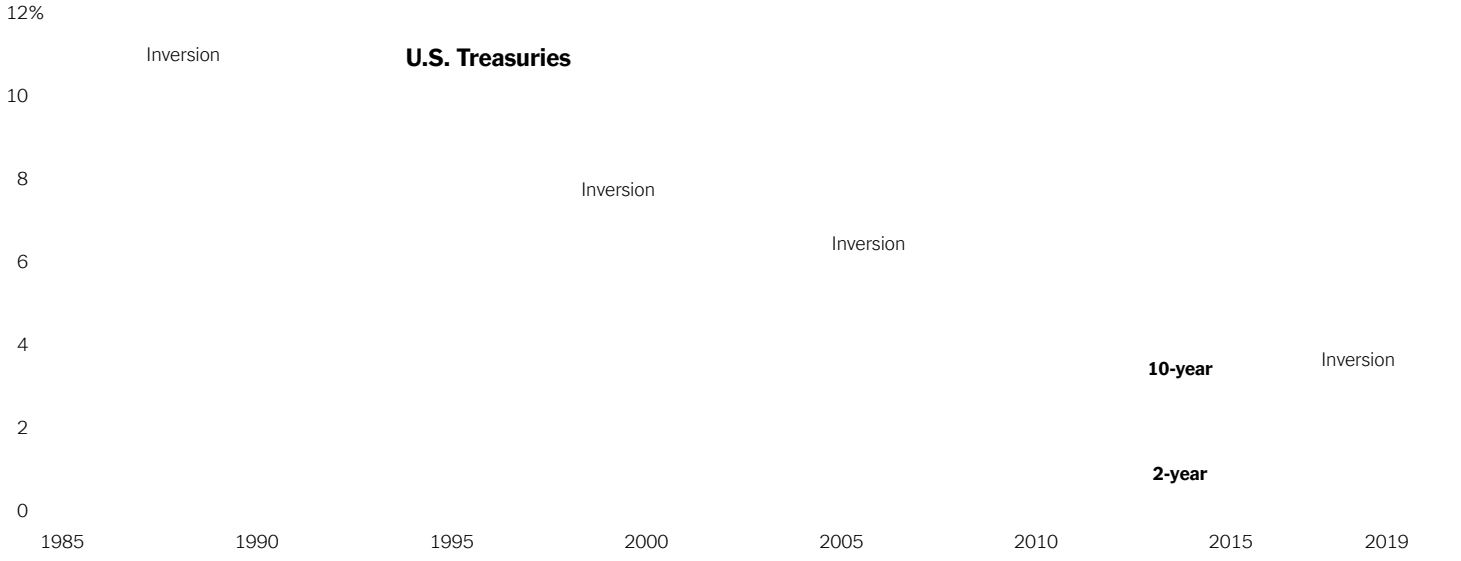



Rate is the federal funds target rate until Dec. 15, 2008, and thereafter the upper limit of the federal funds target rate range. | Source: Federal Reserve

The Federal Reserve on Wednesday lowered interest rates for the second time this year, as it tries to guard the United States economy against trade-related uncertainty and slowing global growth. The central bank cut borrowing rates in late July for the first time since the financial crisis.

The moves are part of an effort to keep borrowing cheap, credit widely available and businesses and consumers confident.

## A so-called inverted yield curve is flashing an economic warning sign




Longer-term bonds have been trading at interest rates that are lower than those on short-term securities — what is known as the yield curve inverting. It's an unusual occurrence that often happens before recessions, and one that could signal that investors have become pessimistic about the economic outlook.

The global economy is slowing as manufacturing activity weakens, and political tensions, including President Trump's trade war with China, are creating uncertainty for businesses. That is slowing down investment, which could hold back growth.

The Fed keeps a close eye on how fast the economy is expanding because the pace of growth is crucial to its two main goals: reaching maximum employment and maintaining stable inflation around 2 percent. A slowdown could prevent policymakers from hitting their long-elusive inflation goal, and a downturn might lead to higher unemployment.

For now, consumers are powering the economy ahead. Unemployment is low, wages are rising and households are spending. But surveys in recent months have shown consumer sentiment may be wavering, a cause for concern if it bleeds into real-life behavior. Consumers fuel about 70 percent of the economy.

## Rates are being lowered around the world

| | Most recent central bank rate cuts . . . Pct. points: −1½ | −1 | −½ | 0 | . . . and increases +½ | +1 | Current rate | G.D.P. in trillions '18 |
|---|---|---|---|---|---|---|---|---|
| **2013** | Uruguay | | | | | | 9.25% | |
| **2015** | Switzerland | | | | | | −0.75% | |
| | Denmark | | | | | | 0.05 | |
| | Poland | | | | | | 1.50 | |
| | **China** | | | | | | 4.35 | **$13.4** |
| **2016** | **Japan** | | | | | | −0.10% | **$5.0** |
| | Morocco | | | | | | 2.25 | |
| | Hungary | | | | | | 0.90 | |
| | Taiwan | | | | | | 1.38 | |
| **2018** | Kuwait | | | | | | 3.00% | |
| | Colombia | | | | | | 4.25 | |
| | Romania | | | | | | 2.50 | |
| | Albania | | | | | | 1.00 | |
| | Kenya | | | | | | 9.00 | |
| | **Britain** | | | | | | 0.75 | **$2.8** |
| | **Canada** | | | | | | 1.75 | **$1.7** |
| | Israel | | | | | | 0.25 | |
| **2019** | Sweden | | | | | | -0.25% | |
| | Ghana | | | | | | 16.00 | |
| | Tunisia | | | | | | 7.75 | |
| | Nigeria | | | | | | 13.50 | |
| | Czech Republic | | | | | | 2.00 | |
| | Malaysia | | | | | | 3.00 | |
| | Zambia | | | | | | 10.25 | |
| | Norway | | | | | | 1.25 | |
| | **Australia** | | | | | | 1.00 | **$1.4** |
| | Pakistan | | | | | | 13.25 | |
| | South Africa | | | | | | 6.50 | |
| | United Arab Emirates | | | | | | 2.50 | |
| | Hong Kong | | | | | | 2.50 | |
| | **Brazil** | | | | | | 6.00 | **$1.9** |
| | Peru | | | | | | 2.50 | |
| | Jordan | | | | | | 4.50 | |
| | Qatar | | | | | | 4.75 | |
| | Bahrain | | | | | | 2.50 | |
| | **India** | | | | | | 5.40 | **$2.7** |
| | Thailand | | | | | | 1.50 | |
| | New Zealand | | | | | | 1.00 | |
| | Philippines | | | | | | 4.25 | |
| | Serbia | | | | | | 2.50 | |
| | Mauritius | | | | | | 3.35 | |
| | Belarus | | | | | | 9.50 | |
| | Namibia | | | | | | 6.50 | |
| | Mexico | | | | | | 8.00 | |
| | Indonesia | | | | | | 5.50 | |
| | Egypt | | | | | | 14.25 | |
| | Sri Lanka | | | | | | 7.00 | |

| | | |
|---|---|---|
| Iceland | 3.50 | |
| Botswana | 4.75 | |
| Chile | 2.00 | |
| Ukraine | 16.50 | |
| **Russia** | 7.00 | **$1.6** |
| Kazakhstan | 9.25 | |
| **Euro Area** | −0.50 | **$13.7** |
| Vietnam | 4.00 | |
| Argentina | 84.01 | |
| **United States** | 2.00 | **$20.5** |

−1½ −1 ½ 0 ½ +1

The United States is in a comparatively strong position compared with other large economic powers: China's economy has already begun to slow, Japan is nowhere near hitting its inflation target despite negative interest rates and Europe is showing cracks as Germany teeters on the brink of a recession.

Against that backdrop, countries around the world have been cutting borrowing costs. Last week, the European Central Bank cut one of its policy rates to a record low and rolled out a broader package of monetary stimulus.

After the Fed's move on Wednesday, the focus will quickly turn to whether it will continue cutting rates before the year's end, or if this move will be enough to keep the American economy humming along.

Based on economic projections released Wednesday, a growing number of Fed officials expect one more reduction this year — in-line with investor and economist expectations.