



RETIREMENT BOARD CALENDAR SHEET
Investment Committee Meeting of July 15th, 2020

To: The Retirement Board, Investment Committee

Through: Jay Huish *JH*
Executive Director

From: William Coaker, Jr. – CFA
Chief Investment Officer

Anna Langs, CFA, FRM
Managing Director, Asset Allocation, Risk
Management and Innovative Solutions

Date: July 15, 2020

Agenda Item:

Update and Discussion on Asset-Liability Study and Strategic Asset Allocation

Background:

Every three years the Retirement System working with the General Consultant, NEPC, conducts Asset-Liability Study and reviews its Strategic Asset Allocation. The attached materials include Staff Memorandum, Asset-Liability Study by NEPC and recommended mixes for alternative Strategic Asset Allocations.

Recommendation:

This is a discussion item.

Attachments:

- Staff Memorandum
- NEPC Asset-Liability Study for SFERS



**San Francisco City and County
Employees' Retirement System
Chief Investment Officer**

William J. Coaker Jr., CFA, MBA

**INVESTMENT COMMITTEE CALENDAR SHEET
Investment Committee Meeting of July 15, 2020**

DATE: July 15, 2020
TO: Members of the Investment Committee
THROUGH: Jay Huish *JH*
Executive Director
FROM: William J. Coaker Jr. – CFA, MBA
Chief Investment Officer
SUBJECT: Asset-Liability Study

Introduction

This memo provides information related to the accompanying "Asset-Liability Study." In making recommendations, Staff highlights the key investment risks in addition to any factors that may mitigate such risks. The Asset-Liability Study is not a recommendation, but it does provide important context for the Strategic Asset Allocation recommendation Staff plans to bring to the Retirement Board in October 2020.

Risks

1 – "Median Expected Return" in Context

Page 13 of the Asset-Liability Study notes that NEPC's estimate for SFERS Median Expected Return over the next 10 years is 7.1% and over the next 30-Years it is 8.1%, based on SFERS current strategic asset allocation.

It is important to interpret these forecasts not as "expected" returns but rather as the "median" returns in a range of probable returns. NEPC calculates that over the next 10 years SFERS has a 46.3% probability of achieving returns of 7.4% or higher and a 53.7% probability of returning less than 7.4%. Summed differently, over the next 10 years NEPC projects that SFERS is slightly more unlikely to achieve our target return of 7.4% than we are to achieve or exceed it. NEPC also estimates there is a 2.0% probability that SFERS returns over the next 10 years are below 0%.

2 – Median Expected Returns Appear to be High

Staff believes the Median Expected Returns on page 13 over the next 10 years are on the high side,. Staff estimates the median return within a range of probable outcomes over the next 10 years for 70% Global Stocks/30% U.S. Bonds is approximately 5.0% and for SFERS current strategic asset allocation it is approximately 5.5%. Our estimate of lower returns compared to NEPC's are based on the following factors:

- Very low bond yields
- High valuations in U.S. stocks and Private Equity
- Lower than normal cap rates in Real Estate
- Lower economic growth compared to history
- Very high levels of government and corporate debt
- Social unease in the U.S. and Europe
- Increased currency risk and rising trade tensions

Staff also surveyed the projected returns of 10 providers of capital markets assumptions - the findings are summarized on page 56. On average, the projected returns over the next 10 years of these firms are about 0.5% lower than NEPC's but higher than Staff's estimates.

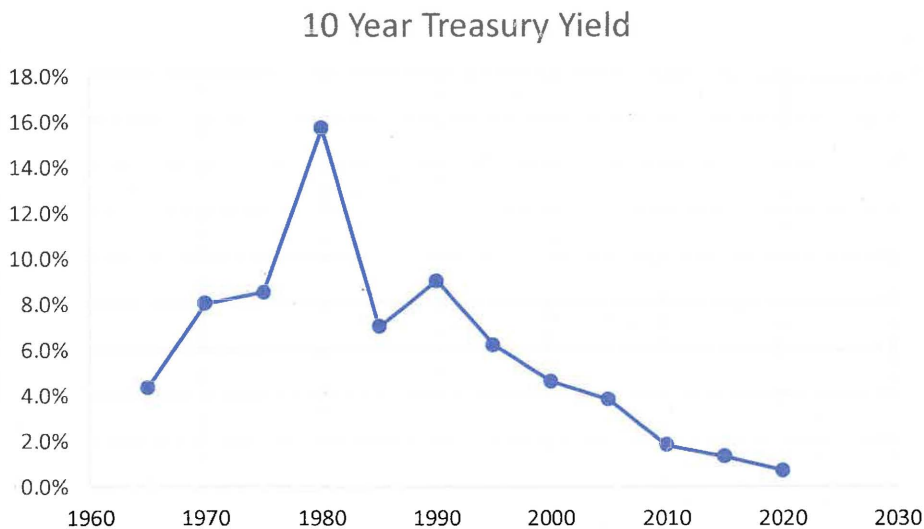
3 – Small Differences of Actual Results that Vary from Median Expected Returns Can Be Significant

Page 13 shows that NEPC's median projected return over 30 years is 8.1%. NEPC also shows that SFERS probability of earning more than 7.4% over the next 30 years is 64.6% and that the odds of earning 7.4% or less is 35.4%.

Staff notes that the impact of even a modestly lower returns than our required return of 7.4% over 30 years is significant. For example, the difference between earning 6.4% over the next 30 years reduces our funded status by more than 30% compared to earning 7.4%.

4 – Bond Yields are Very Low, Requiring Pension Plans to Increase Risk to Achieve Required Returns

The following chart shows that Treasury yields are currently ultra-low on both an absolute basis and compared to history. Low treasury rates mean that SFERS needs to take meaningful risk to earn our required rate of return.



5 - Equity Valuations Appear to be High, and High Valuations Are Linked to Lower Future Returns

The U.S. Price-Earnings (PE) ratio is currently about 40% higher than its long-term average of about 16. Above-average valuations are linked to lower than average future returns. For example, when the PE ratio of the S&P 500 hit its all-time high of 30 in late 1999, subsequent 10 year returns from 2000 to 2009 were 0.9%. It could be argued that two enormous bear markets – the bursting of the internet bubble in 2000-02 and the Global Financial Crisis of 2008 – severely detracted from the returns posted from 2000 to 2009.

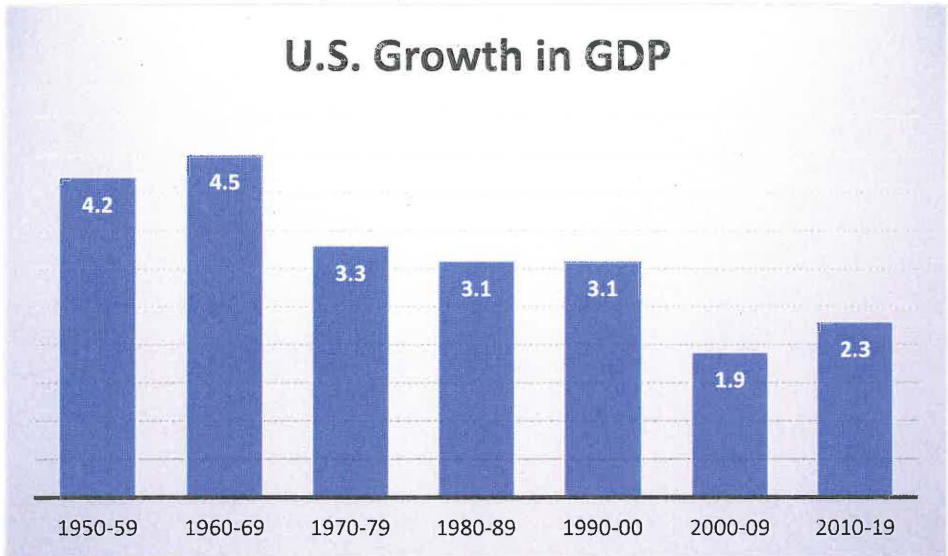


The Price-Earnings ratio in Europe is lower than the U.S. at about 15, but Europe is plagued by low economic growth and social and currency issues. The PE ratio in Emerging Markets is also about 15, but developing countries involve unique political, currency, and other risks that oftentimes plague their development.

6 – Economic Growth Has Slowed, and Pension Plans Require Growth to be Sustainable

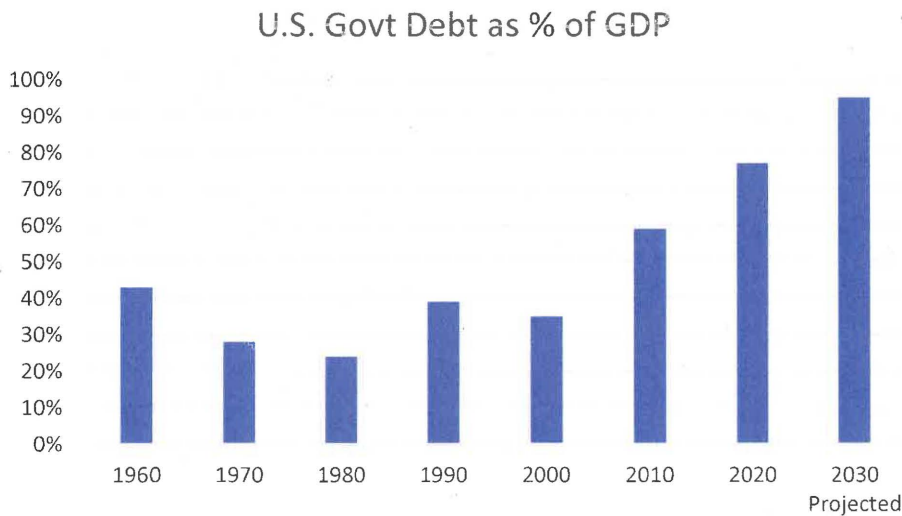
As shown in the chart below, economic growth in the U.S. over the past two decades has slowed significantly compared to history. Growth in Europe has slowed even more so, and growth in Japan has been even lower still. The economic development of China the past two decades has been a boon to global growth, but GDP growth there has slowed from double-digits a decade ago to mid-single digits.

As noted earlier, at today's ultra-low treasury rates our pension plan depends on growth to be sustainable, but economic growth has slowed considerably. U.S. GDP in 2019 was \$21.4 trillion. GDP growth of 2% annualized instead of 3% for two decades equals more than \$6 trillion of national wealth that is not created.



7 – Debt Levels are Very High, and Represent a Potentially Sizeable Risk

The following chart shows that U.S. government debt levels have risen substantially. High levels of debt are linked to lower economic growth. Indeed, as our debt levels have soared the past two decades, economic growth has trended lower. Our pension plan depends on economic growth to earn the 7.4% required rate of return.



As U.S. debt levels began moving higher over the past 50 years, the U.S. dollar has depreciated during that time. For example, \$100 dollars in 1970 is worth about \$15 today, due to inflation. Further, the constitution of the inflation basket and hedonic adjustments likely result in actual inflation being higher than reported.

In addition to lower economic growth, high levels of debt are also linked to financial crashes. A study conducted by Carmen Reinhart and Kenneth Rogoff concluded that “a nation faces nearly insurmountable problems if its debt rises significantly above 80% of GDP.” With the recent stimulus to provide business and households with income after COVID-19 prompted a shutdown of large parts of our economy, U.S. government debt is approaching 100% of GDP.

Staff views the soaring debt by the U.S. government as well as in developed countries around the world as quite worrisome. The debt burden increases the likelihood of lower economic growth, government benefit programs being cut, higher taxes, higher inflation, or a currency crisis.

8 – Structural Changes Cannot Be Fully Captured

Return projections summarized on page 13 of the Asset-Liability Study depend on a reversion to mean valuations. The types of risks described above relate to possible future stress events that have not occurred in the U.S. in the past nearly 100 years.

Future returns based on mean reversion also do not capture structural changes that may occur. Page 52 notes that Natural Resources are projected to return 9.01% over the next 10 years and 9.09% over the next 30 years. Oil is a large portion of the Natural Resources composite. For 90 years oil had no competition, but now it has competition from gas and renewables. Oil also faces political and regulatory pressure and adverse sentiment among some institutional investors. Finally, electric vehicles are getting closer to be in position to take market share, and COVID-19 may negatively impact oil demand due to more people working from home and less business travel.

Real Estate investing could also undergo considerable change, due to the impact of COVID-19. Businesses, especially in high cost cities, could re-think how much they spend on occupancy costs, given the effectiveness many businesses have experienced in the wake of more people working from home. Student Housing could be impacted as well if students and/or faculty seek to assure greater personal safety and more learning moves online.

Staff thinks the human experience is amid an enormous structural shift from the Industrial Age to Science, Technology, and Innovation, from the physical to the digital. We think the digital transformation still has decades to play out, and we think the Science and Technology revolution will be as impactful on business and the human experience as moving from the Agriculture Era to the Industrial Age.

9 – Classifying Assets as Growth, Diversifying, and Income-Generating Has Limits

Page 14 of NEPC's Asset-Liability Study summarizes our allocation by Growth Assets, Diversifying Assets, and Income-Generating Assets. Growth Assets include Public and Private Equity, Diversifying Assets include Real Assets and Absolute Return, and Income-Generating Assets are comprised of Private Credit and other assets whose return largely or exclusively depends on income.

Real Assets are comprised of Real Estate and Natural Resources, whose returns depend on economic growth. Even Private Credit depends on growth necessary for companies to pay interest and principal. Hence, SFERS' returns depend more on growth than the Table on page 14 may infer.

Real Estate, Natural Resources and Private Credit do have exposures that differ from Public Equity, hence their respective classifications in Diversifying Assets and Income-Generating Assets, respectively, but their returns also depend meaningfully on growth.

10 – Sometimes Diversification Works Very Well, But Sometimes it is Less Effective

In periods when stocks have suffered large losses, sometimes diversification has worked especially well, but sometimes it has been less effective.

In the bursting of the internet bubble in 2000-02, the S&P 500 lost 38%, but value stocks, real estate, high yield bonds, and absolute return all earned positive returns. Many of those assets even earned double digit returns. In this period, diversification worked exceptionally well.

However, in the Global Financial Crisis from August 2007 to February 2009 when the S&P 500 plunged -51%, diversification did not work nearly as well. International and Emerging Markets lost even more than U.S. stocks, Real Estate values plunged, High Yield Bonds lost about 30%, and Absolute Return fell 20%. Back then, only U.S. Treasuries posted positive returns.

Diversification also did not work particularly well in 1Q2020. The S&P 500 lost -19.4% while International and Emerging Markets lost even more. High Yield and Emerging Market bonds fell more than 10% while our Absolute Return portfolio also lost just over 10%. In 1Q2020, only U.S. Treasuries posted positive returns.

While Public and Private Equity, Real Estate, Natural Resources, High Yield and Emerging Market Bonds, Private Credit, and Absolute Return, can all behave like equities when stocks decline, each also has unique features that differ from stocks. Hence, while diversification sometimes works less well than others, it is an important aspect of our investment strategy for two reasons. First, diversification sometimes works very well, as it did in 2000-02. Second, even when diversification does not work especially well, it provides at least some benefit when stocks incur a large decline.

11 – Black Swan Events

Black Swans are unpredictable events that have extreme consequences. COVID-19 is an example of a Black Swan event. It is a reminder that human health and economic prosperity are fragile. Black Swan events can have a large impact on our returns, and they occur from time to time.

Mitigating Factors

This section highlights factors that may mitigate some or many of the risks mentioned here.

1 – SFERS Has Earned 7.4% or Higher Over All Historical 30-Year Periods

SFERS current required rate of return is 7.4%. This is the return required to pay benefits and maintain a 100% funded status. The next chart shows that SFERS has earned over 7.4% across all 30-year time periods. One caution is that the beginning of the time series is 1976, so there are only 16 periods of 30-years. Another caution is that bond yields today are much lower compared to the average yield over the time frame shown in the chart.

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2 – SFERS Has Earned Significant Alpha Through Manager Selection in Recent Years

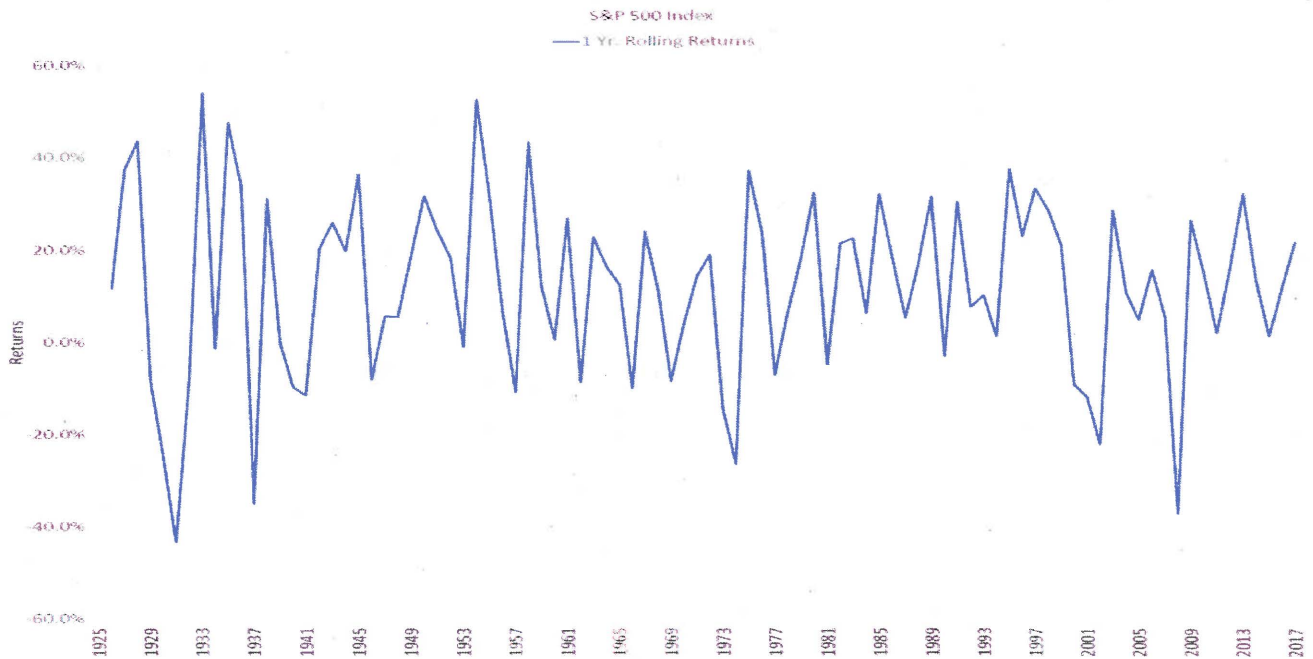
The returns noted in the Asset-Liability Study are “beta” returns, meaning the returns for a specified asset allocation or asset class. They do not include “alpha” returns, meaning the returns above or below beta returns. Alpha returns are primarily due to manager selection. While Staff has lower projected median returns over the next 10 years than NEPC, we do seek to earn excess returns (alpha) through manager selection. The past 5 years Staff has posted higher returns of 2.64% annualized than our peers.

----- Annualized Excess Returns v. Peers through 3-31-2020 -----

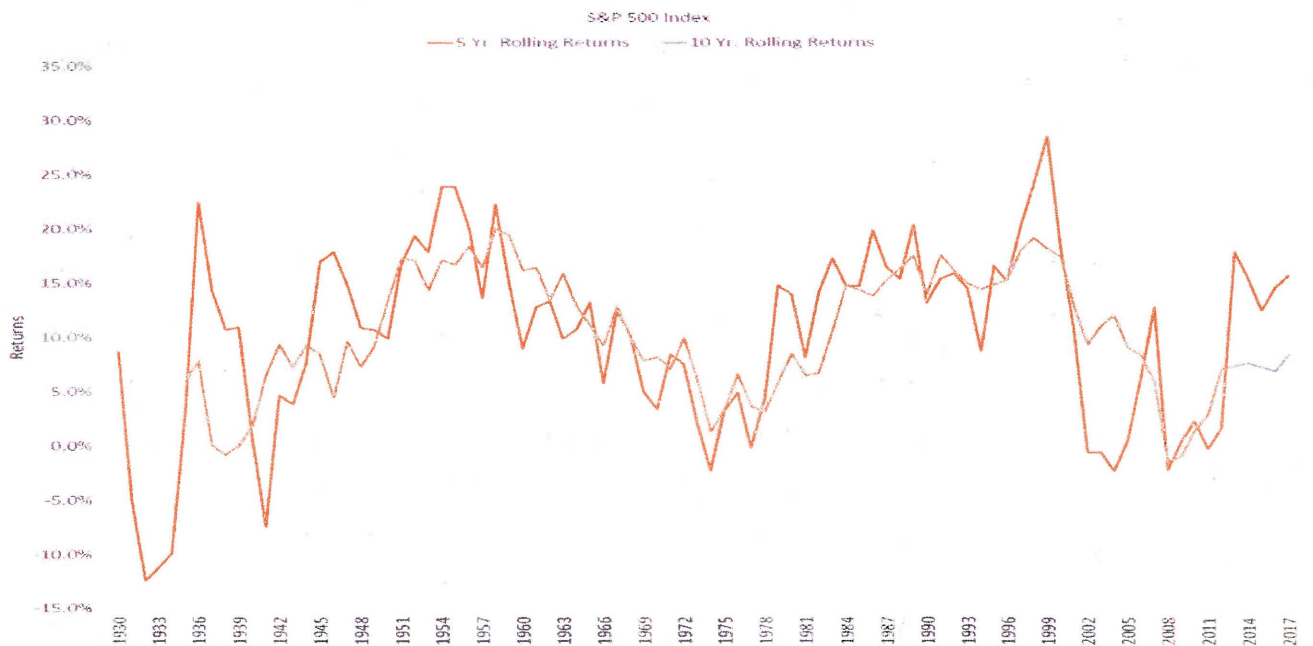
Excess Returns v. Median Peer	1Q2020	FYTD	1 Year	3 Years	5 Years	10 Years
SFERS	4.67%	4.89%	5.30%	2.60%	2.64%	1.92%
Public Equity	2.79%	2.70%	2.52%	1.98%	1.20%	0.81%
Private Equity	2.24%	3.94%	5.62%	3.79%	2.95%	2.44%
Real Assets	3.06%	4.33%	3.71%	6.63%	8.51%	5.97%
Private Credit	1.07%	4.19%	5.39%	5.98%	4.30%	1.47%
Absolute Return	-2.70%	-2.67%	-2.09%	-0.99%		
Fixed Income	1.02%	0.56%	0.49%	0.01%	-0.29%	0.73%

3 – Equity Volatility Declines Over Time, and Stocks Have Posted High Returns Over Long-Time Horizons

The variability of returns in the S&P 500 over one-year can be extreme, as shown in the next chart.

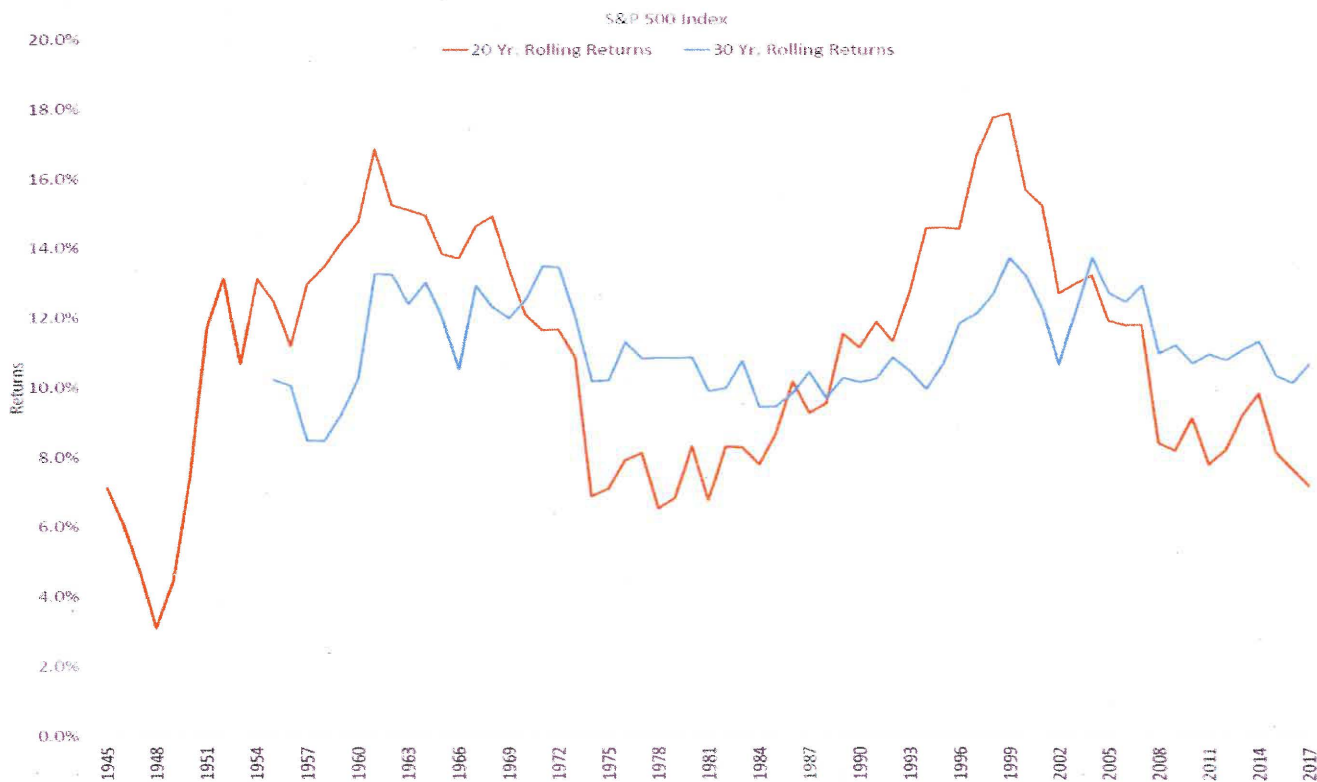


As shown in the next chart, approximately half the volatility of 1-year equity returns goes away over 5 years, and even more goes away over 10 years. That said, even 10 year returns in the S&P 500 have occasionally been exceptionally low, and on a few occasions they have even been negative.



In the short term, equity investing may be generous, or punishing. Over 1 year an equity investor could lose a ton of money, and sometimes returns even over 10 years have proved to be exceptionally low or slightly negative.

The good news of equity investing is that, while in the short-term stock returns may be generous or punishing, over very long periods they have always been generous. Over a 30-year period the minimum return on the S&P 500 has been 8.5% annualized, which equates to a minimum compound return of 10.5x. The average return on the index from 1926-2020 has been 10.0%, which over 30 years equals a 17.5x compound return.



NEPC's 30 year assumed rate of return for SFERS Public Equity portfolio of 7.52% seems reasonable, considering that the S&P 500 has historically returned a minimum of 8.5% over all 30-year periods. Staff also notes that NEPC's assumed 30 year returns for the other asset classes listed on page 52 of the Asset-Liability Study are lower than their historical long-term averages.

APPENDIX

Mr. Kenneth Rogoff is a Professor of Economics at Harvard University. He served as the Chief Economist at the International Monetary Fund from 2001 to 2003 and served at the Board of Governors of the Federal Reserve System.

Ms. Carmen Reinhart is a published author on topics including international capital flows, inflation, sovereign debt crisis, and currency crashes. Her works have been published in *The Economist*, *Newsweek*, *The Washington Post*, and the *Wall Street Journal*, among others. In 2011 and 2012 she was named among the "50 Most Influential" by Bloomberg Markets. Last month Ms. Reinhart was named the Chief Economist of the World Bank.

In 2009 Ms. Reinhart and Mr. Rogoff published a book titled "This Time is Different: Eight Centuries of Financial Folly" which details eight centuries of government borrowings and financial crashes.

ASSET-LIABILITY STUDY

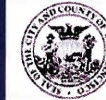
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Investment Committee Meeting
July 15, 2020

Allan Martin, Partner

Dan Hennessy, CFA, CAIA, Senior Consultant

Lynda Dennen, ASA, EA, Senior Consultant



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SFERS ALM PROCESS CALENDAR (REVISED)

<p>February 12, 2020 (Board Meeting)</p>	<p>Review Asset Liability Process:</p> <ul style="list-style-type: none"> - Capital Market Assumptions - Projected Returns of SFERS Total Fund Return/Volatility <p>Introduction to Leverage</p>
<p>July 15, 2020 (Investment Committee)</p>	<p>GTAA Education</p> <p>Present results of Asset Liability Study</p> <p>Review and seek direction on:</p> <ul style="list-style-type: none"> - Eligible asset classes (including GTAA) - 6 asset mixes
<p>August 12, 2020 (Board Meeting)</p>	<p>Asset Allocation discussion</p> <p>Follow-up: Education on Leverage</p>
<p>September 9, 2020 (Board Meeting)</p>	<p>Board approval of Asset Allocation Policy/Asset Mix</p>
<p>October 14, 2020 (Board Meeting)</p>	<p>Board approval of Revised Investment Policy Statement</p>

INTRODUCTION

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AGENDA

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EXECUTIVE SUMMARY – BACKGROUND

This report presents the results of the asset-liability study conducted on the City and County of San Francisco Employees' Retirement System

The goals of the study are to:

- **Review the current and projected financial status of the Plan**
 - Project pension liabilities and benefit payments
 - Project asset growth and contribution levels

- **Assess the appropriateness of the current asset allocation relative to the expected progress of liabilities and cash flows**
 - Analyze the tradeoffs of asset class changes

- **Use multiple models to develop comprehensive understanding of plan dynamics**
 - Risk and return of asset allocation
 - Relationship between assets and liabilities
 - Liquidity constraints

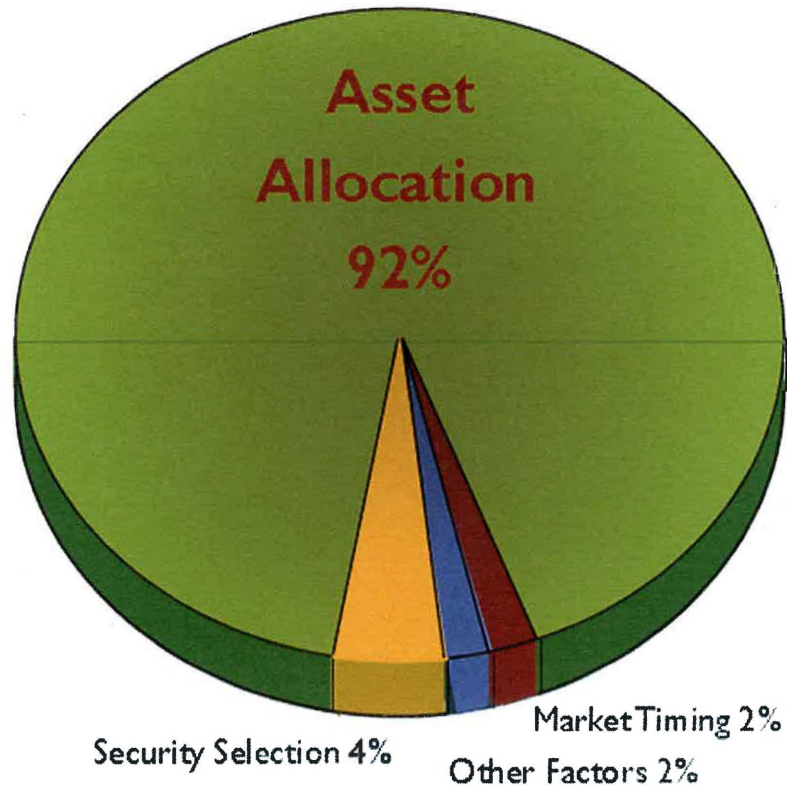


EXECUTIVE SUMMARY – KEY FINDINGS

- **The funded status of the Plan fell from 91% as of July 1, 2019 to an estimated 86% as of July 1, 2020**
 - Estimated asset return for FYE 2020 is 1.3%
- **The current Policy Target allocation is expected to produce an average return of 7.1% over the next 10 years, less than the target of 7.4% expected return on assets (EROA)**
 - Due to higher interest rates in the long term, the 30-year return is expected to return 8.1% per year on average
- **This allocation and liability analysis investigates important allocation decisions for improving financial outcomes**
 - Increasing public and private equity to increase return expectations
 - Reducing real assets and absolute return to increase liquidity
 - Adding a dedicated allocation to GTAA to provide liquid tail-risk protection and tactical beta
 - Considering the use of Long Treasuries to provide potential protection against market volatility under some market stress scenarios
- **The use of leverage is introduced to increase the probability of achieving the target EROA of 7.4%**

ASSET ALLOCATION: THE KEY INVESTMENT DECISION

Determinants of Portfolio Performance



Source: *Determinants of Portfolio Performance II: An Update*, Brinson, et al, *Financial Analysts Journal*, May/June 1991, pp 40-48.

ASSET LIABILITY FRAMEWORK

Identify Key Issues

- **Investment-related themes**
- **Demographic trends/changes**
- **Regulatory environment**

Projection of Assets & Liabilities

- **Funded status**
- **Contribution requirements**

Multi-Faceted Risk Assessment

- **Mean-variance optimization**
- **Risk budgeting**
- **Economic scenario analysis including assessment of non-consensus outcomes**
- **Liquidity stress test**
- **Sensitivity to market shocks**

Asset Allocation Recommendation

- **Better risk-adjusted returns**
- **Better performance in stressed economic environments**
- **Increased liquidity**
- **Higher funding ratio**

HISTORICAL PLAN REVIEW

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