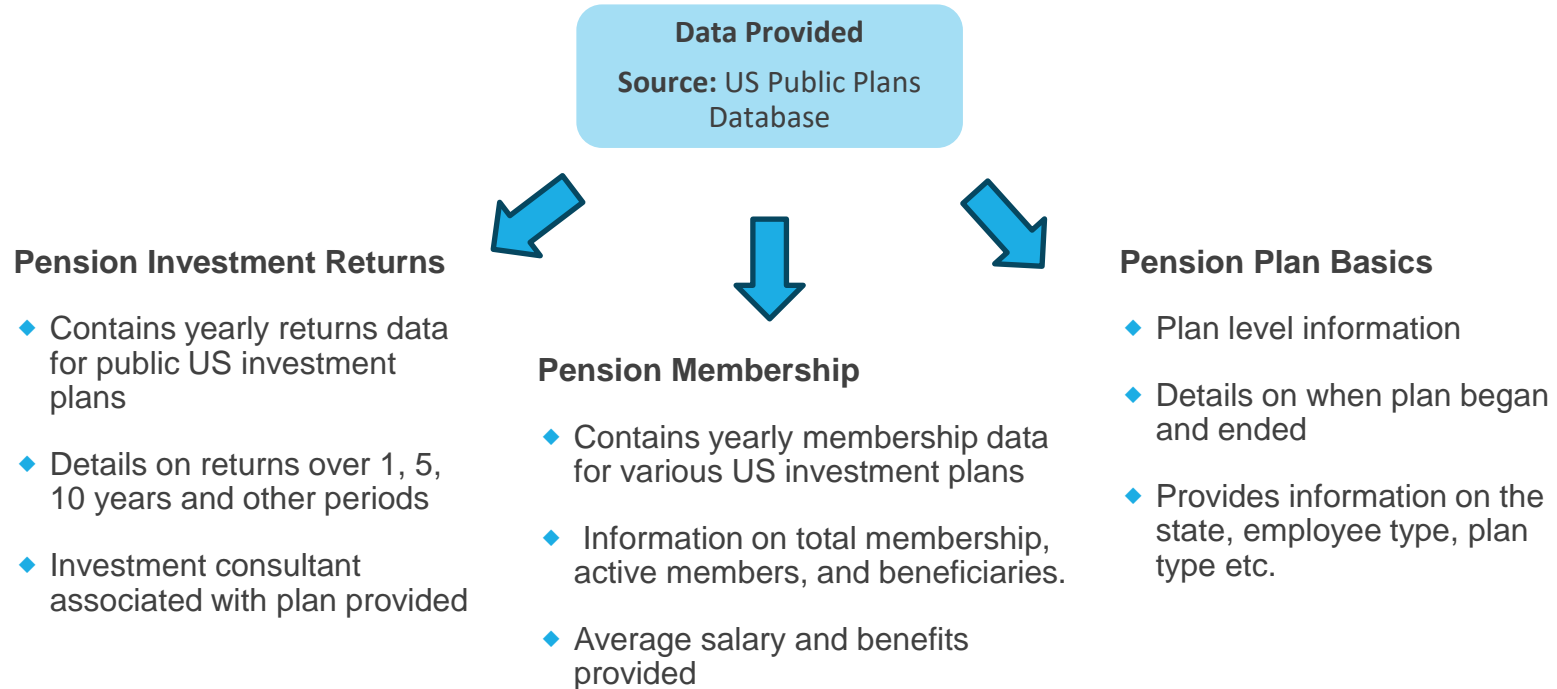


A low-angle, upward-looking shot of several modern skyscrapers with glass facades. The sun is shining brightly from the top center, creating a starburst effect and casting long shadows on the building surfaces. The sky is a clear, vibrant blue with a few wispy clouds. The perspective creates a sense of height and architectural grandeur.

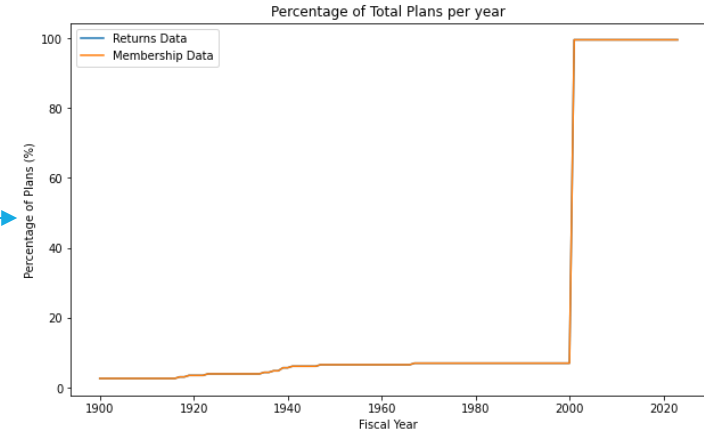
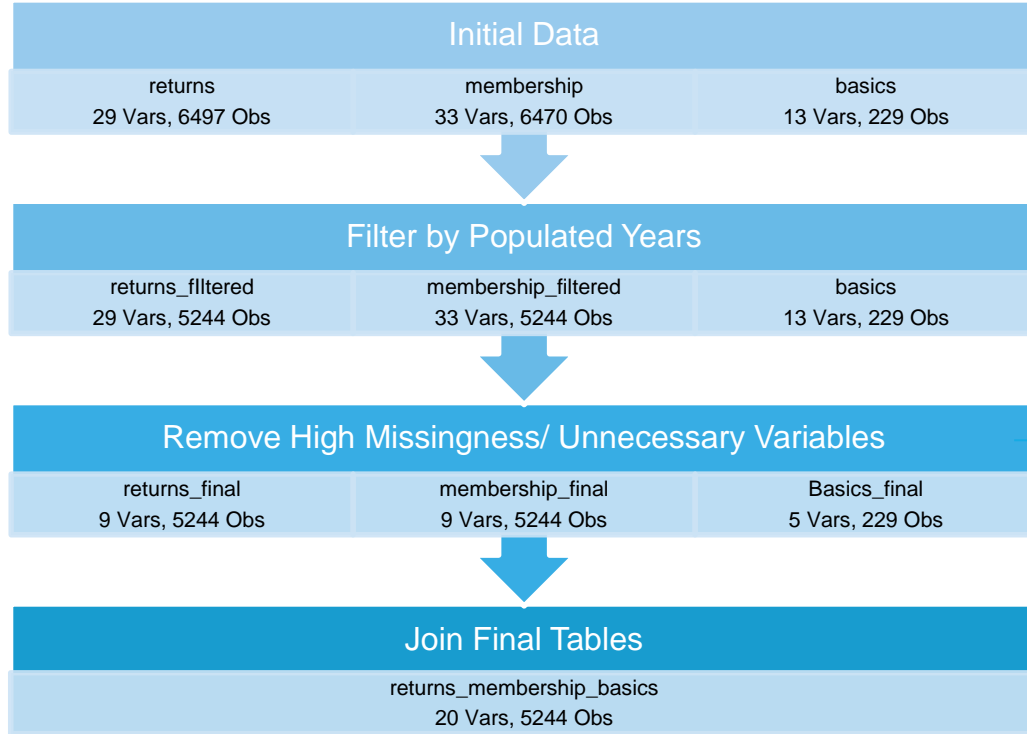
Pension Data Analysis

Zach Buckley

Data Overview



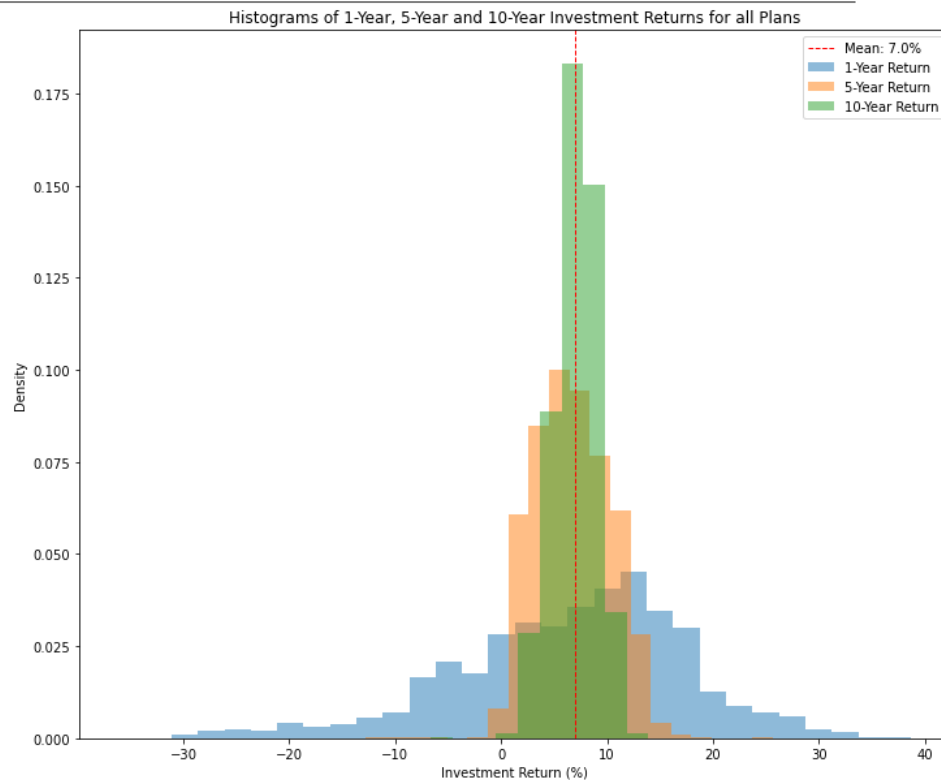
Data Cleaning and Preparation



	Missing Values	Zero Values	Total
PlanName	0.00	0.00	0.00
fy	0.00	0.00	0.00
ppd_id	0.00	0.00	0.00
TierID	55.63	44.37	100.00
AvgReturn_10yr	43.25	0.00	43.25
AvgReturn_3yr	12.89	0.10	12.99
AvgReturn_5yr	21.59	0.02	21.61
EEGroupID	0.00	100.00	100.00
InvestmentReturn_1yr	4.00	0.19	4.20

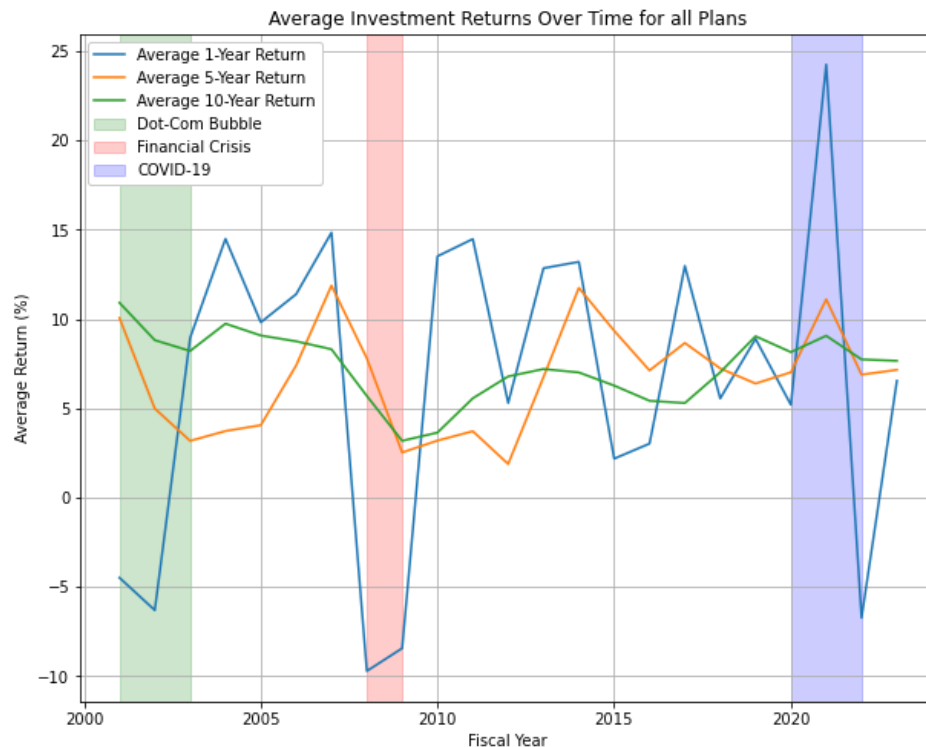
Pension Returns

- ◆ Histograms show comparison of the 1, 5 and 10-year investment returns for all plans.
- ◆ As expected, the volatility of returns significantly reduces over longer periods.
- ◆ **1-Year return**
 - ◇ High volatility
 - ◇ Returns range from -30% to +40%
- ◆ **10-Year return**
 - ◇ Low volatility
 - ◇ Returns rarely negative,
 - ◇ Majority of plans providing a return close to the mean of 7%.



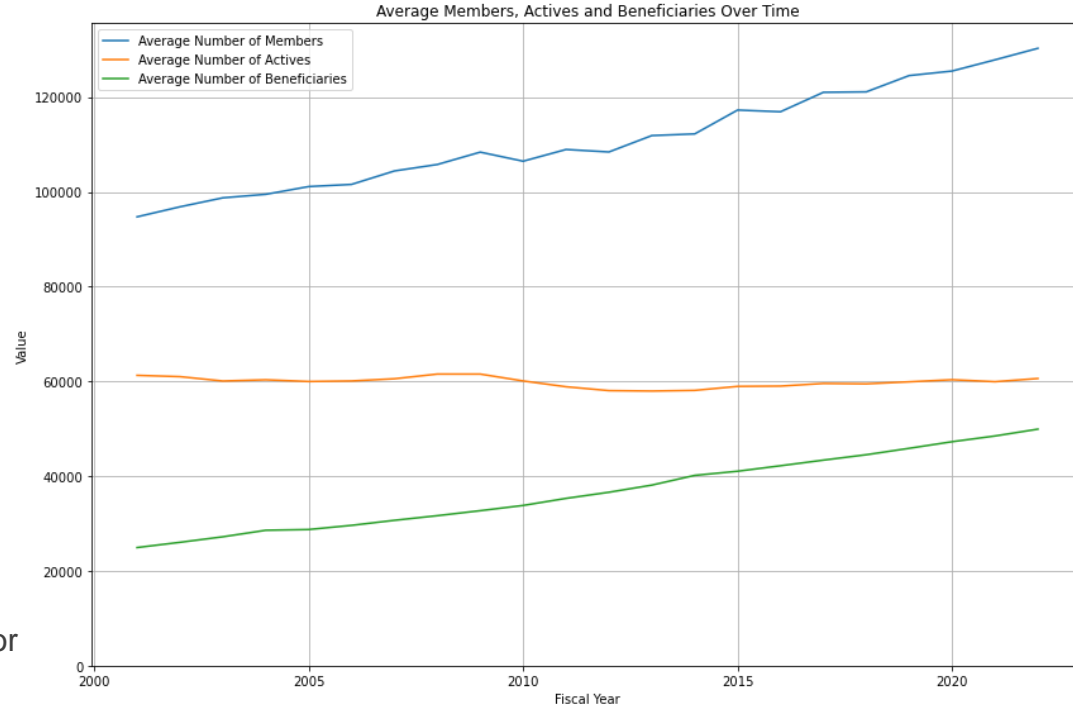
Returns Over Time

- ◆ Plot shows 1, 5 and 10-year investment returns per year
- ◆ 10-year return shows consistent returns over time, largely ranging between 5 - 10%
- ◆ **Dot-Com Bubble and Financial Crisis**
 - ◆ Significant reduction in average 1-Year return in 2001, 2002, 2003, 2008 and 2009
 - ◆ Mean 1-Year return dropped to -0.5% during the post-Dot Com Bubble period and to -9.1% during the financial crisis
- ◆ **COVID-19**
 - ◆ Significant increase, then decrease in 1-Year returns following COVID-19
 - ◆ Standard deviation increased by 29% during this period when compared with the overall period



Members Over Time

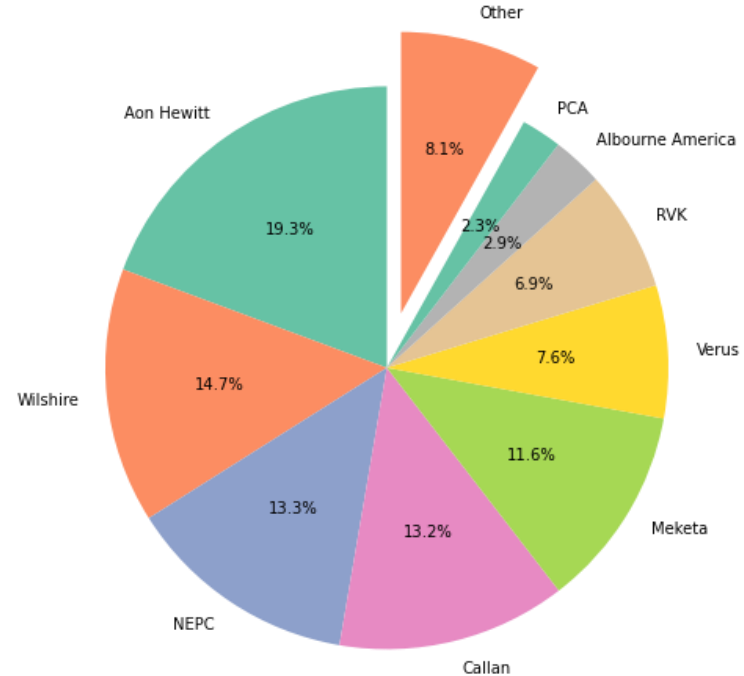
- ◆ Plot shows the average number of members, active members and beneficiaries over time per plan.
- ◆ **Average Members and Beneficiaries**
 - ◇ Steadily increased
 - ◇ Could reflect an aging population - more members transitioning from active status to beneficiary status
- ◆ **Average Active Members**
 - ◇ Remains relatively flat
 - ◇ Limited growth in the contributing workforce
- ◆ Overall, could indicate a growing dependency on active contributors and a potential area of concern for the sustainability of the pension funds.



Consultants Overview

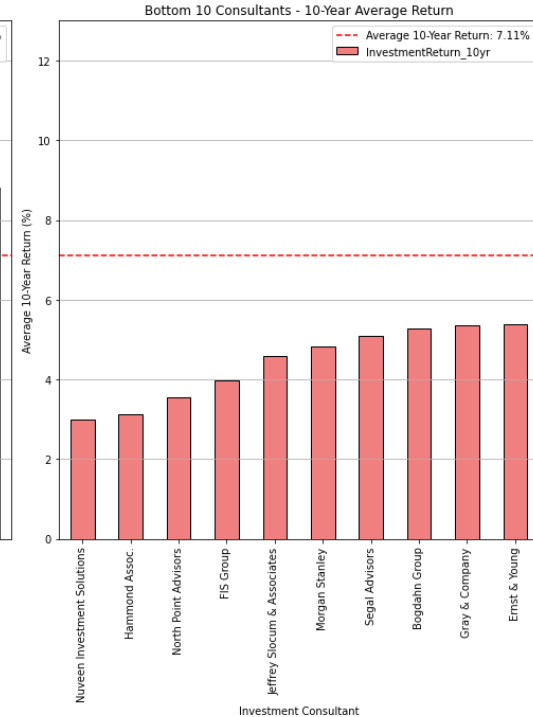
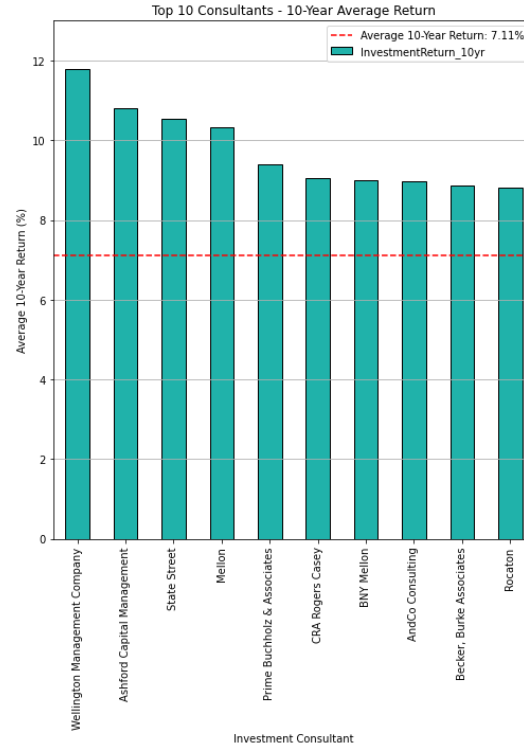
- ◆ Pie chart shows the percentage of total members managed by each consultant
- ◆ The top four consultants are Aon Hewitt, Wilshire, NEPC and Callan who, combined, manage over 50% of the total members

Percentage of Total Members Managed by Investment Consultants (2022)



Consultant Performance

- ◆ Bar charts show the top and bottom 10 performing consultants based on their average 10-year return.
- ◆ Wellington Management Company provides the highest average return with 11.8%
- ◆ Nuveen Investment Solutions Provides the lowest returns with 3.0%
- ◆ Notably, none of these consultants are in the top consultants for total members
 - ◇ Consultants with more members may be more risk averse with investments, providing returns closer to the average



Conclusions and Potential Next Steps

Conclusions

◆ Returns over different periods:

- ◆ Economic events such as the Dot-Com Bubble, the 2008 financial crisis and COVID-19 had significant impacts on returns

◆ Membership Trends:

- ◆ Stagnant number of active members compared to beneficiaries could be cause for concern

◆ Consultants:

- ◆ The top consultants significantly outperformed the mean
- ◆ The larger scale consultants were not among the top or bottom performers indicating they may adopt less risky investment strategies

Next Steps

◆ Missingness Analysis:

- ◆ Increased data missingness for 2023 could be explored
- ◆ Data imputation methods could be considered

◆ Detailed Consultant Performance Analysis:

- ◆ Investigate investment strategies of top consultants
- ◆ Can this performance be maintained

◆ Cross-Country Comparison:

- ◆ Compare results with pension data from other countries to understand how US performance stacks up