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Aging and Retirement

PBGC Retirement Plans Mortality Study

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PBGC Retirement Plans Mortality Study

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Section 1: Executive Summary

This report summarizes a study of Pension Benefit Guaranty Corporation (PBGC) mortality experience performed by the Society of Actuaries (SOA). The PBGC is a federal corporation that insures the pension benefits of participants in private defined benefit pension plans in the event of a distress termination, a plan termination in which the plan does not have enough funds to pay participant benefits. In distress terminations, the PBGC will become the plan trustee and pay out participant benefits up to a maximum guarantee.

The SOA's Retirement Plans Experience Committee (RPEC) felt it was important to analyze and understand the PBGC mortality experience because the PBGC is the trustee for a large number of financially distressed U.S. pension plans and data from the PBGC was not included in the development of the most recent SOA private pension mortality tables, RP-2006 (SOA 2018), RP-2014 (SOA 2014) and Pri-2012 (SOA 2019). This is the SOA's first study of PBGC experience and provides another comparison point of retirement plans mortality experience for work performed by pension actuaries.

The PBGC provided mortality experience data for single-employer plans from September 30, 2009 through September 30, 2014 for the study. This data included 3,133,131 life-years of exposure and 116,434 deaths. This study contains actual to expected (A/E) ratios for various splits of the data, such as age group, gender, collar, and status. The expected basis used for the A/E ratios is the SOA's amount-weighted[1] RP-2006 Mortality Tables. The RP-2006 Mortality Tables are based on the same data as the SOA's RP-2014 Mortality Tables, but the Scale MP-2014 mortality improvement is removed from the RP-2014 Mortality Tables for the years 2007–2014 such that the mortality rates are as of the year 2006, the central year of the RP-2014 study dataset. The number of deaths behind each A/E ratio is also provided to assist the user in determining credibility.

The A/E results vary greatly depending on age group, gender, collar, status, the number of deaths, and whether the aggregate or collar-specific RP-2006 table is used as the expected basis. For healthy retirees, A/Es tend to be lower and below 100% at younger age groups and higher and above 100% at older age groups, except for white collar experience compared to the white collar RP-2006 tables, for which the A/Es tend to be flat across age groups and above 100%. Results can be found in Section 3.

[1] The RP-2006 tables include separate sets of rates developed using experience weighted by headcount and amount. Salary for employees and pension benefit amount for annuitants were used to weigh the amount-weighted rates.

Section 2: Data Collection and Validation

The same data request that was used for the Pri-2012 study was sent to the PBGC and consisted of the following seven documents:

1. A cover letter outlining the goals of the study, an approximate timetable, and the required file formats
2. A plan-level information questionnaire, which requested details regarding the format of the submission and characteristics of the plan
3. A document containing instructions for completing the plan-level information questionnaire
4. A participant-level information specification worksheet, which showed the information that must be provided for each participant and denoted the situations for which each field is required
5. A document containing instructions regarding each item in the participant-level information specification worksheet
6. An Excel file showing a sample submission
7. A file that summarized the list of acceptable inputs for some categorical data fields

Given the format of the PBGC dataset, several alterations were made to the format outlined in the Pri-2012 data request:

1. The data were provided with no individual plan identification
2. Only retirees were included. Active Employees and Contingent Survivors were excluded from the data
3. A "Date of Plan Termination" was provided, which served as an "as-of" date for the disability status code provided by the PBGC
4. Collar type was determined at the plan level only, based on the name of the plan.

The PBGC provided data for the period September 30, 2009 through September 30, 2014. MIB Solutions Inc.'s Actuarial and Statistical Research Group collected, validated, and summarized the data for this report. The review process included the validation of key fields such as gender, date of birth, date of death, and date of retirement, including a review for consistency between fields. Some issues, such as missing date of birth or gender, were not fixable, and in these cases, records needed to be excluded from the study. However, the overall number of records with issues was low, and more than 99.9% of the data provided was included in the study.

The final dataset used in the analysis consisted of over three million life years of exposure and over 116,000 deaths. Table 2.1 details the breakdown of this data by gender and status.

Table 2.1
SUMMARY OF EXPOSURES AND DEATHS IN FINAL DATASET

		Blue Collar		White Collar		Unknown Collar		Total	
		Exposures	Deaths	Exposures	Deaths	Exposures	Deaths	Exposures	Deaths
Healthy Retiree	Female	702,032	23,155	272,325	7,787	4,868	259	979,225	31,201
	Male	1,793,953	71,393	299,563	10,719	8,181	250	2,101,698	82,362
	Total	2,495,985	94,548	571,888	18,506	13,050	509	3,080,923	113,563
Disabled Retiree	Female	11,044	514	1,590	63	99	2	12,733	579
	Male	37,426	2,182	1,788	103	261	7	39,475	2,292
	Total	48,470	2,696	3,378	166	360	9	52,208	2,871
Total	Female	713,076	23,669	273,915	7,850	4,967	261	991,959	31,780
	Male	1,831,379	73,575	301,351	10,822	8,442	257	2,141,173	84,654
	Total	2,544,456	97,244	575,266	18,672	13,409	518	3,133,131	116,434

In Section 3, the PBGC mortality data will be compared to the RP-2006 mortality tables. For comparison of the results in aggregate, it is important to keep in mind the different collar type concentrations between the two sets of data. Table 2.2 shows the collar breakdowns by gender and status. Here are some observations of note:

- The Blue Collar concentration is higher and the White Collar concentration is lower in the PBGC dataset compared to the RP-2006 dataset, particularly for males.
- The PBGC dataset has a comparatively smaller amount of data classified as Unknown Collar

Table 2.2
COLLAR TYPE CONCENTRATION OF RP-2006 AND PBGC DATASETS BY GENDER AND STATUS

		Collar Concentration (Life-Years of Exposure)					
		Female			Male		
		Blue	White	Unknown	Blue	White	Unknown
Retiree	RP-2006	56.1%	31.4%	12.5%	52.2%	27.6%	20.1%
	PBGC	71.7%	27.8%	0.5%	85.4%	14.3%	0.4%
Disabled Retiree	RP-2006	73.3%	13.8%	12.9%	60.1%	11.9%	28.0%
	PBGC	86.7%	12.5%	0.8%	94.8%	4.5%	0.7%

The average benefit amounts in the PBGC dataset are substantially lower than those from the RP-2006 tables. As higher pension benefit amounts have historically been correlated with lower pensioner mortality, this is important context for the comparisons shown in Section 3. Table 2.3 displays a comparison of the average benefit amount between the two sets of data.

Table 2.3

AVERAGE BENEFIT AMOUNT IN RP-2006 AND PBGC DATASETS BY GENDER AND STATUS

		Average Benefit Amount	
		Female	Male
Retiree	RP-2006	$ 8,784	$ 14,496
	PBGC	$ 3,957	$ 7,787
Disabled Retiree	RP-2006	$ 7,584	$ 8,796
	PBGC	$ 3,706	$ 7,580

Section 3: Analysis

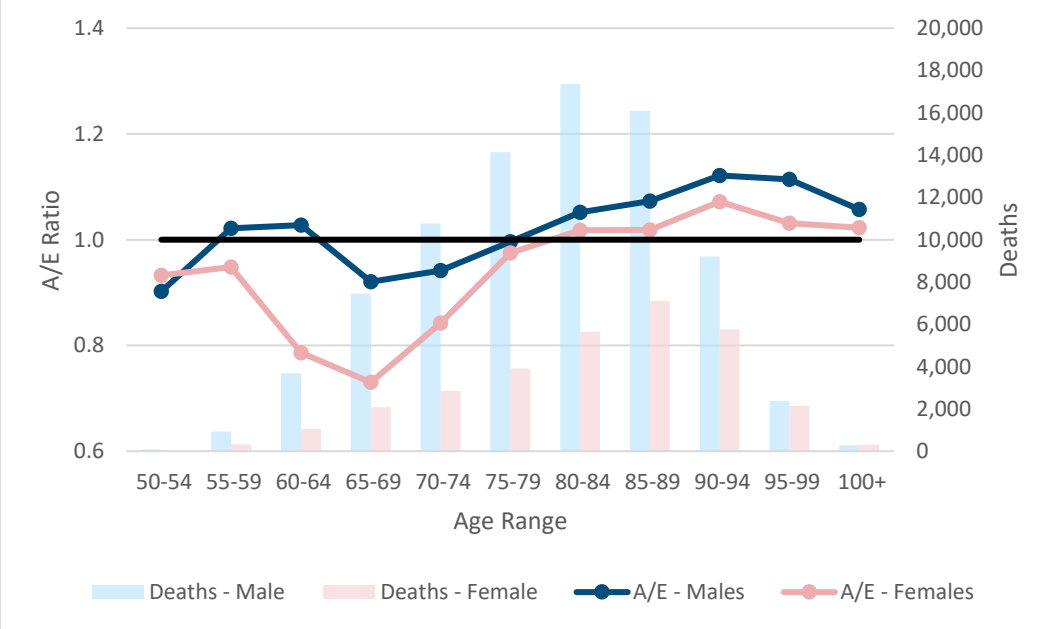
3.1 Total Dataset Healthy Retiree Observations

The PBGC healthy retiree mortality results were compared to the RP-2006 Healthy Annuitant mortality rates projected with Scale MP-2016[2] (SOA 2016). The RP-2006 rates used were those developed from mortality experience data weighted by pension benefit amount ("amount-weighted" rates), as these are more commonly used for pension valuation purposes. The comparisons shown in this Section 3, therefore, compare PBGC amount-weighted mortality experience to RP-2006 amount-weighted mortality experience.

The charts in this section display actual-to-expected (A/E) mortality ratios. Expected deaths were determined by projecting the RP-2006 mortality rates to each individual year of experience using Scale MP-2016 and multiplying these adjusted rates by the number of exposures. For example, the expected deaths for males age 60-64 in 2012 were determined by applying Scale MP-2016 mortality improvement for the years 2007-2012 to the RP-2006 rates and multiplying by the number of life-years of male age 60-64 exposures for 2012. Expected deaths for each calendar year of the study period were added together to determine the total expected deaths, which are compared to the total actual deaths across the study period for each age group.

Using the basis described above, the aggregate A/E ratios for male and female retirees were 102.4% and 94.2%, respectively. Figure 3.1 shows that these comparisons vary by age. For both genders, the PBGC mortality is higher than the expected basis for ages above 80. Females in the PBGC dataset exhibit substantially lower mortality than the expected basis at the young retirement ages. At ages younger than 80, males show an A/E ratio of approximately 1.0 or slightly lower.

Figure 3.1
TOTAL DATASET A/E RATIOS BY GENDER AND AGE
RATIO OF PBGC MORTALITY TO RP-2006 PROJECTED WITH SCALE MP-2016



[2] Scale MP-2016 was the most recently released scale in the SOA's "MP" series at the time of the data analysis.

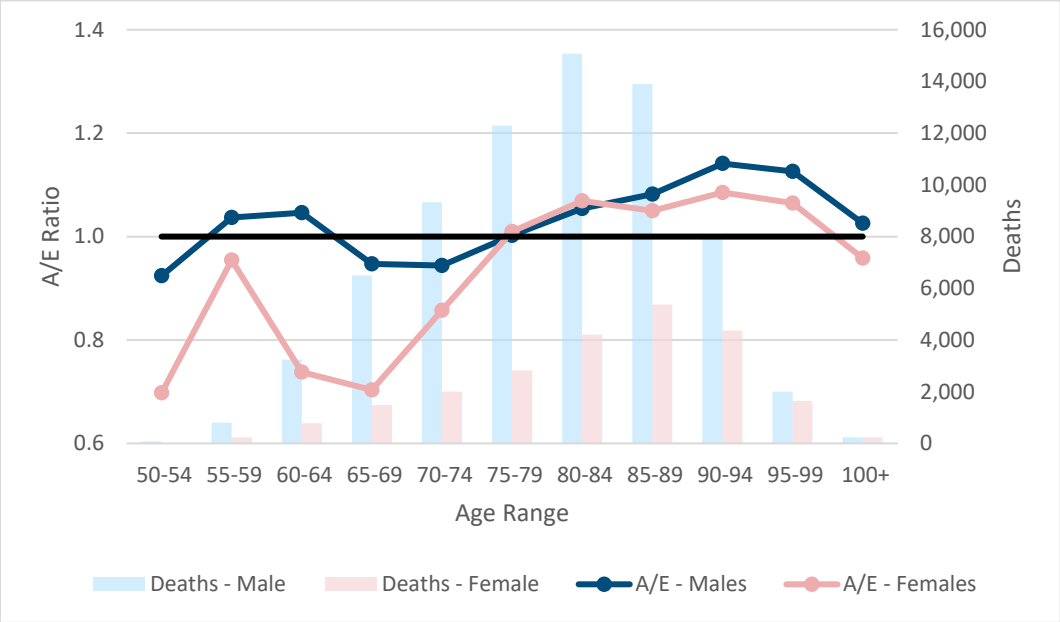
3.2 Blue Collar Healthy Retiree Observations

Using the same expected basis as above, the aggregate A/E ratios for blue collar male and female healthy retirees were 103.3% and 95.4%, respectively. As expected, the blue collar A/E ratios are higher than those for the total dataset. The difference is small, which can be attributed to the fact that a significant majority of the total dataset is made up of blue collar data (see Table 2.2). Figure 3.2 shows how these A/E ratios change by age. The pattern for blue collar males has a similar pattern to that for the total PBGC male data, except shifted slightly upward. The same is generally true for females above age 70. However, below age 70, female blue collar PBGC mortality is actually lower than that for the female total PBGC dataset.

Figure 3.2

BLUE COLLAR A/E RATIOS BY GENDER AND AGE

RATIO OF PBGC BLUE COLLAR MORTALITY TO RP-2006 PROJECTED WITH SCALE MP-2016

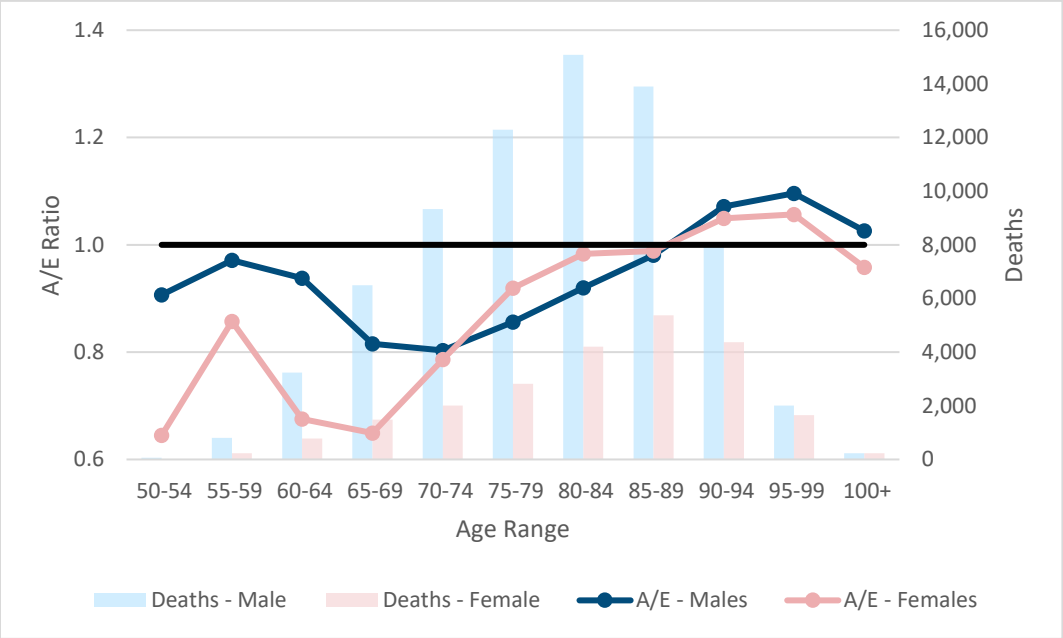


RP-2006 includes separate blue collar and white collar tables. Using the RP-2006 blue collar table as the expected basis can show how the PBGC blue collar mortality compares to RP-2006 blue collar mortality. The aggregate A/E ratios for males and females on this basis were 90.9% and 88.8%, respectively. Figure 3.3 shows that PBGC dataset has generally lower blue collar mortality for both genders, except above age 90.

Figure 3.3

BLUE COLLAR A/E RATIOS BY GENDER AND AGE

RATIO OF PBGC BLUE COLLAR MORTALITY TO RP-2006 BLUE COLLAR PROJECTED WITH SCALE MP-2016



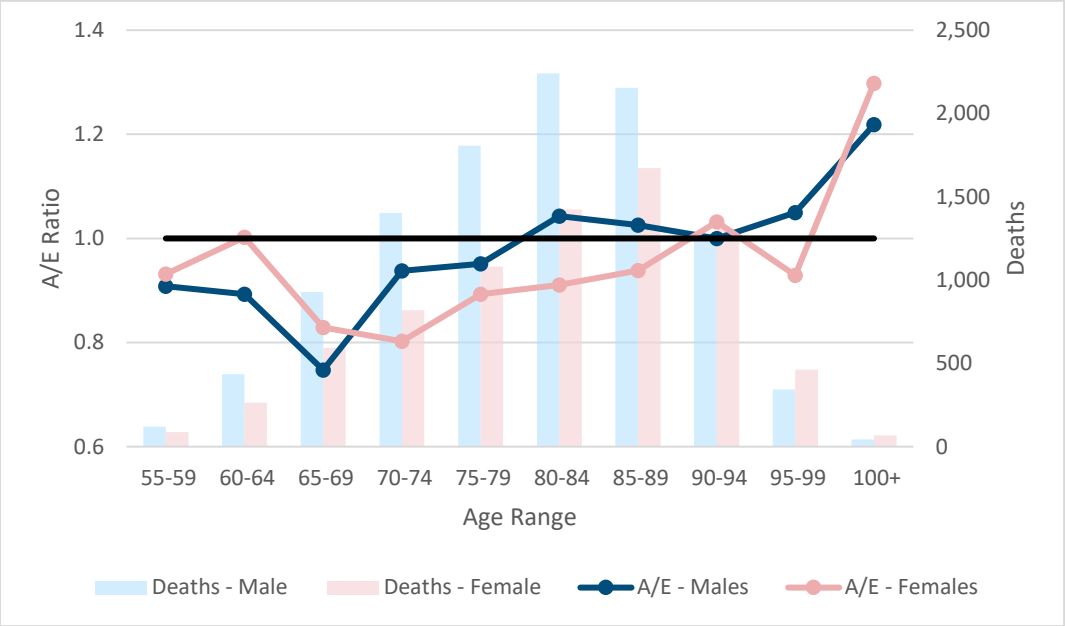
3.3 White Collar Healthy Retiree Observations

Using an expected basis of the RP-2006 total dataset table projected with MP-2016, the aggregate A/E ratios for male and female white collar healthy retirees in the PBGC dataset were 97.1% and 90.9%, respectively. Figure 3.4 shows how mortality in the PBGC dataset compares to the expected basis by age. The PBGC mortality is lower for males up to age 80 and then generally higher above age 80. Females have an A/E ratio at approximately 1.0 or below, except above age 100. Note that the 50-54 age group is not included due to a small sample of data.

Figure 3.4

WHITE COLLAR A/E RATIOS BY GENDER AND AGE

RATIO OF PBGC WHITE COLLAR MORTALITY TO RP-2006 PROJECTED WITH SCALE MP-2016

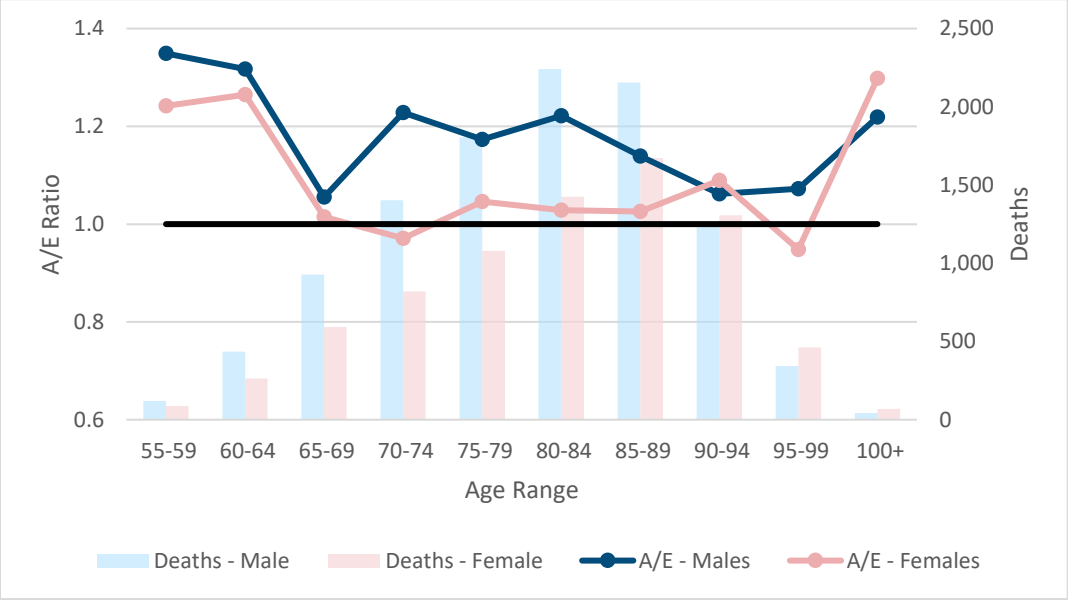


Since RP-2006 includes separate tables by collar, Figure 3.5 shows a comparison of the PBGC white collar data to a white collar expected basis from RP-2006. On this basis, the aggregate A/E ratios for males and females are 116.2% and 103.8%, respectively. Generally, for males, white collar mortality in the PBGC dataset is substantially higher than that estimated by RP-2006 white collar projected with Scale MP-2016. For females, the A/E ratios are close to 1.0 for ages 65-99, which include the bulk of the white collar data. However, there is considerably higher mortality in the PBGC data at the younger retirement ages (55-64).

Figure 3.5

WHITE COLLAR A/E RATIOS BY GENDER AND AGE

RATIO OF PBGC WHITE COLLAR MORTALITY TO RP-2006 WHITE COLLAR PROJECTED WITH SCALE MP-2016



3.4 Disabled Retiree Observations

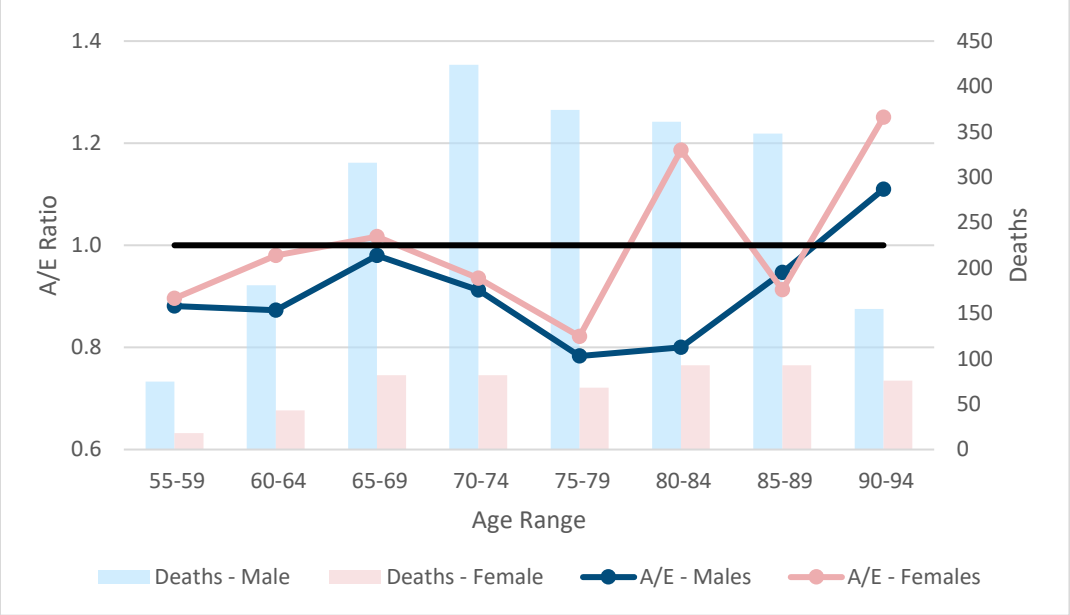
As detailed in Table 2.1, the PBGC disabled retiree data included in this study is made up of approximately 95% blue collar exposures. The female dataset is small, with under 13,000 exposures in total.

Using an expected basis of RP-2006 Disabled Retiree projected with Scale MP-2016, the A/E ratios for the PBGC Disabled Retiree male and female data are 88.6% and 97.9%, respectively. Figure 3.6 displays how this pattern varies by age. Note that there were a very small number of disabled retiree exposures above age 94 in the PBGC data. Male A/E ratios are below 1.0 for all age groups except 90-94. The female A/E ratios are higher than those for males in most age groups.

Figure 3.6

DISABLED RETIREE A/E RATIOS BY GENDER AND AGE

RATIO OF PBGC WHITE COLLAR MORTALITY TO RP-2006 WHITE COLLAR PROJECTED WITH SCALE MP-2016



Section 4: Reliance and Limitations

No assessment has been made concerning the applicability of this experience to other purposes. In developing this report, the SOA relied upon data and information supplied by the PBGC. This information includes, but is not limited to, the data submission for mortality experience and the responses to follow-up questions.

The results in this report are technical in nature and dependent on certain assumptions and methods. No party should rely upon these results without a thorough understanding of those assumptions and methods. Such an understanding may require consultation with qualified professionals. This report should be distributed and reviewed only in its entirety.

Section 5: Acknowledgements

The SOA extends its gratitude to the PBGC for furnishing the data for this study and for all of the efforts made to answer questions throughout the process. The SOA contracted with MIB Solutions Inc.'s Actuarial and Statistical Research Group to collect, validate, and compile data for this report.

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About The Society of Actuaries

The Society of Actuaries (SOA), formed in 1949, is one of the largest actuarial professional organizations in the world dedicated to serving 32,000 actuarial members and the public in the United States, Canada and worldwide. In line with the SOA Vision Statement, actuaries act as business leaders who develop and use mathematical models to measure and manage risk in support of financial security for individuals, organizations and the public.

The SOA supports actuaries and advances knowledge through research and education. As part of its work, the SOA seeks to inform public policy development and public understanding through research. The SOA aspires to be a trusted source of objective, data-driven research and analysis with an actuarial perspective for its members, industry, policymakers and the public. This distinct perspective comes from the SOA as an association of actuaries, who have a rigorous formal education and direct experience as practitioners as they perform applied research. The SOA also welcomes the opportunity to partner with other organizations in our work where appropriate.

The SOA has a history of working with public policy makers and regulators in developing historical experience studies and projection techniques as well as individual reports on health care, retirement and other topics. The SOA's research is intended to aid the work of policymakers and regulators and follow certain core principles:

Objectivity: The SOA's research informs and provides analysis that can be relied upon by other individuals or organizations involved in public policy discussions. The SOA does not take advocacy positions or lobby specific policy proposals.

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