SOCIETY OF ACTUARIES

Pension Valuation Methods and Assumptions

Second Edition

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SPONSOR Pension Section

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Introduction/Background

This second edition updates the prior version published in 2012. This edition is updated to reflect changes made since the last version, as well as to add links to other publications of interest.

This report contains matrices comparing the guidelines for assumptions and methods used to prepare actuarial valuations for retirement plans in the United States and Canada. Section I of this report includes an executive summary of the key assumptions and methods. Section I is intended to provide information valuable to any reader. Section II includes detail regarding the assumptions and methods including citations (and Web addresses) of regulatory and professional guidance where available. Section II is intended for readers familiar with actuarial practice and pension plans. Section III of this report includes a glossary intended to clarify terms or phrases that have specific meaning. Words included in the glossary will be highlighted in bold capital letters throughout this report.

We hope to answer the common question of "what is the liability?" with clarity and with a road map that ties to an actuary's typical response of "for what purpose?" Our goal is to help readers understand the differences between pension liability calculations based on geography (Canada and the United States), valuation purposes (accounting, solvency and funding) and plan type (private, municipal, federal and Social Security).

We strive to provide a concise summary of the guidance with sufficient details regarding all assumptions and methods. Where we have provided less detail we have provided the Web address (where available) to permit the reader to gather more primary source information.

Political bias and commentary are not intended to be included in these matrices. We have identified actuarial practice and current market conditions where relevant in the matrix. If bias or opinion appears to be present, it is unintentional and my sole responsibility.

Thank you to all who provided oversight and guidance throughout this process. We have received input, guidance and support from former colleagues, current colleagues, competitors, new acquaintances, family and friends—thank you for all your unrecognized contributions. Thank you to the Project Oversight Group—Barbara Scott, David Cantor, Uros Karadzic, Tom Lowman, Andrew Peterson, David Rigby, Tom Sablak and Steve Siegel for opinions and critiques, and providing the guidance and peer review required to complete this project.

We encourage readers to consider the matrices included coupled with discussions with plan sponsors to determine the best methods and assumptions to measure the expected funding/accounting/solvency of pension plans.

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Table 1—Private U.S. Single-Employer Pension Plans

	Accounting	PBGC Premiums & Termination	Funding
Primary Objective	**Comparability.**	**Solvency.**	**Solvency.**
Discount Rate	**High-Quality** corporate bonds The rate of return on a hypothetical portfolio of **high-quality** fixed income securities that generate cash flows matching the expected amount and timing of payments from the pension plan.	Lump sum payments at plan termination are based on IRS published rates (based on **investment grade** corporate bonds). **PBGC premium** liability calculations are based on Pension Benefit Guaranty Corporation (PBGC) published rates (based on corporate bond yields).	The IRS publishes rates for valuations based on **investment grade** corporate bonds. Legislation passed in 2012 and extended in 2014 calls for a corridor to be applied to current yields to consider historical 25-year averages of these rates.
Key Characteristics	▪ Liabilities include the cost of future salaries on past service. ▪ Liabilities are measured assuming the company remains in existence as a "going concern."	Liabilities and assets consider current market conditions and liabilities related to termination (for example unpredictable contingent event benefits and plant shutdown benefits). The effects of future salary increases are not considered.	Funding valuation requires consideration of current market conditions but permits additional tax-favored prefunding opportunities for future liabilities. Only benefits earned on or before the last day of the plan year are considered for funding requirements.
Investment Considerations	▪ Balance sheet requirements do not reward equity investment risk taking. ▪ Income statement accounting provides reward for equity investment risk taking. ▪ Sponsors are considering, and in some cases implementing, asset/liability matching, cash flow matching and bond investment; however, most pension plans still include equities in plan assets.	**PBGC premium** payment is based on termination liability and does not consider possible future returns from investment management. If a plan is terminated, benefits are paid (by annuity purchase or lump sum settlement) based on interest rates that do not consider possible future investment returns.	Regulation reduces the short-term benefit of equity investment. The increased volatility of funding resulting from equity investment is only minimally offset by the benefit of increased returns (and there is delay in that recognition).
Trends	Recognition of market prices on the valuation date based on current market conditions. Possible convergence with International Financial Accounting Standards (IFRS)/IAS19.	Recognition of market prices on the valuation date based on current market conditions. There have been significant premium increases in recent years.	Recognition of market prices on the valuation date based on current market conditions.

Details regarding Private U.S. Single-Employer Pension Plans assumptions and methods can be found in Section II—Table 18.

Executive Summary Matrices

Table 2—Private U.S. MULTIEMPLOYER Pension Plans

	Accounting	PBGC PREMIUMS & TERMINATION	Funding
Primary Objective	CONTRIBUTION EQUITY.	CONTRIBUTION EQUITY.	SOLVENCY.
Discount Rate	No assumption/not applicable. MULTIEMPLOYER costs are reported based on contribution requirements.	The PBGC charges a fixed premium based on head count only. There is no direct relationship between benefits promised by a plan and premiums charged by the PBGC (however PBGC guarantees are lower than for single-employer plans and not indexed). The PBGC publishes interest rates that approximately replicate annuity purchase rates that may be used for WITHDRAWAL LIABILITY calculations. Practice note: Most practitioners use funding rates, or a combination of funding and settlement rates, to determine withdrawal liability.	For purposes of determining the annual funding for a plan, the assumed discount rate must be ACTUARIALLY REASONABLE. Usually based on expected returns.
Key Characteristics	Participating sponsors do not directly report long-term financial risks of plans. The responsibility for determining funding adequacy and benefit communication rests with plan trustees.	Annual reports/notices to members of the plan, the PBGC, and the Department of Labor regarding funding and SOLVENCY. In some cases automatic benefit adjustment provisions are implemented to restore poorly funded plans to long-term SOLVENCY.	Valuations allow for longer-term actuarial smoothing of contributions. Recognition of SOLVENCY is included on a long-term basis.
Investment Considerations	Accounting appears to have no direct effect on investment direction—participating employers report contributions on financial statements.	Possibility of withdrawal liabilities and increased annual contribution, especially resulting from Pension Protection Act (PPA) MULTIEMPLOYER "endangered/critical" status reports that put pressure on joint trustees to solve underfunding issues.	Possibility of withdrawal liabilities and increased annual contribution, especially resulting from **PPA** MULTIEMPLOYER "endangered/critical" status reports that put pressure on joint trustees to solve underfunding issues.
Trends	Continued contribution focus.	Continued contribution focus with increased consideration of SOLVENCY and benefit reductions. Significant premium increases in recent years and new legislation allowing benefit cuts for certain plans.	Continued contribution focus with increased consideration of SOLVENCY.

Details regarding Private U.S. MULTIEMPLOYER Pension Plans assumptions and methods can be found in Section II—Table 19.

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Table 3—U.S. Federal Government Pension Plans

	Accounting	SOLVENCY/Funding
Primary Objective	**TRANSPARENCY.**	**COST STABILITY.**
Discount Rate	The discount rate is equal to the expected rate of return on investments. This rate is currently based on the 40-quarters (10-year) historical average return (investments are in government bonds; therefore, this discount rate is government yields). Consideration should be given to the timing of the liabilities relative to the interest rates on investments of matching maturities per written Federal Accounting Standards Advisory Board (FASAB) guidance (see SFFAS 5 paragraph 66 and SFFAS 33 paragraph 28). All assumptions for the largest plans are reviewed with the Board of Actuaries.	The discount rate is currently equal to the expected rate of return on investment based on historical rates. All assumptions are reviewed with the Board of Actuaries.
Key Characteristics	Valuations measure the long term and do not directly reflect risk-free rates or current market conditions. This methodology is allowed to provide for longer-term consistent contributions that recognize that no plan termination is expected.	Funding is based on regulatory mandates. Funding for new participants recognizes actuarial costs. Funding for old liabilities and participants is made according to schedules that do not directly recognize actuarial costs.
Investment Considerations	Not applicable—the plans are mandated to invest in government securities.	Not applicable—the plans are mandated to invest in government securities.
Trends	There is significant public scrutiny of public pension plan funding and reporting. The most visible current market debate is regarding state/local/municipal plans; therefore, debate and discussion regarding federally sponsored plans are not as prevalent—however, consideration of the obligations made and the accounting for those obligations is subject to current debate and scrutiny.	Continued focus on cash flow adequacy. Public discussion of federal pension programs has increased but continues to be secondary to the discussion regarding state and local programs. Funding challenges are prompting more discussion about long-term plan sustainability for programs such as the military pension program.

Details regarding U.S. Federal Government Pension Plans assumptions and methods can be found in Section II—Table 20.

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Executive Summary Matrices

Table 4—U.S. State and Local Government Pension Plans

	Accounting	SOLVENCY/Funding
Primary Objective	**ACCOUNTABILITY** and **INTERPERIOD EQUITY.**	**COST STABILITY.**
Discount Rate	The discount rate is currently equal to the expected rate of return on plan investments to the extent assets are expected to be sufficient to cover liabilities and 20-year tax-exempt **HIGH-QUALITY** municipal bonds rated AA/Aa or higher otherwise.	Generally specified in state or local statute; usually intended to reflect the expected rate of return on plan assets. Often the assumption cannot be changed without sponsor approval (a prescribed assumption).
Key Characteristics	Unfunded Liability under Entry Age Normal method is booked as a liability. Long-term measurement does not directly reflect risk-free rates or current market conditions when based on expected returns. Some gains and losses phased in but no real amortization of unfunded liability.	Actuarially Determined Contribution (ADC) usually based on Normal Cost and a long-term amortization of unfunded liability as a percentage of future payroll. Funding may follow regulatory mandate (fixed employer contribution rate). Some legislation directly recognizes actuarial costs and adjusts funding regularly. Some legislation does not directly link to actuarial costs.
Investment Considerations	The allowance to recognize expected return on invested assets creates incentive to take investment risk (as it lowers the amount booked as a liability). There is no inherent incentive to match assets and liabilities.	The allowance in statutes to set funding level without strict link to actuarial costs can result in no direct incentive for conservative investments—if costs can be made up with asset returns there is less direct impact on taxpayers. Likewise, if investments decline in value there is more direct impact on taxpayers.
Trends	Extreme scrutiny of public pension plan funding/reporting measurement. Challenges with reporting and funding levels are front-page news.	Extreme scrutiny of public pension plan funding/reporting measurement. Challenges with reporting and funding levels are front-page news. Use of lower discount rates to measure pension liabilities because of lower capital market expectations.

Details regarding U.S. State and Local Government Pension Plans assumptions and methods can be found in Section II—Table 21.

* GASB 67 is applicable for fiscal years beginning after June 15, 2013. GASB 68 is applicable for fiscal years beginning after June 15, 2014. For prior valuations refer to GASB 25/27.

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Table 5—U.S. Social Security

	Accounting	SOLVENCY/Funding
Primary Objective	Long-term SOLVENCY and TRANSPARENCY.	SUSTAINABLE SOLVENCY.
Discount Rate	The investment earnings expected to be used to provide a portion of expected benefit payments are relevant in the Social Security open group valuation. The discount rate should be ACTUARIALLY REASONABLE based on the invested assets. This assumption is critical in determining present value measurements. Additionally, expectations regarding the investment returns available to provide annual cash flows are factors in determining plan solvency; however, demographic assumptions remain the most critical assumptions in determining the projected annual expected cash flows of the system.	The investment earnings expected to be used to provide a portion of expected benefit payments are relevant in the Social Security open group valuation. The discount rate should be ACTUARIALLY REASONABLE based on the invested assets. This assumption is critical in determining present value measurements. Additionally, expectations regarding the investment returns available to provide annual cash flows are factors in determining plan solvency; however, demographic assumptions remain the most critical assumptions in determining the projected annual expected cash flows of the system.
Key Characteristics	Close to a pay-as-you-go funding method—this method seeks to match long-term disbursements (benefit payments and expenses) with long-term income (contributions and investment earnings). The open group valuation directly recognizes the compulsory nature of participation and long-term nature of the promise.	Funding and benefit levels are determined by legislation. Actuarial valuations do not currently show SUSTAINABLE SOLVENCY under current program provisions. Goal for SUSTAINABLE SOLVENCY is explicitly recognized and measurements and studies are done regularly to refine actuarial measurement subject to current market conditions.
Investment Considerations	Not applicable—mandated investment in government securities.	Not applicable—mandated investment in government securities.
Trends	SUSTAINABLE SOLVENCY—recognition of unsustainable trend line under current program provisions and economic realities. Active debate regarding program is taking a backseat to Medicare/hospital insurance concerns.	SUSTAINABLE SOLVENCY—recognition of unsustainable trend line under current program provisions and economic realities. Active debate regarding program is taking a backseat to Medicare/ hospital insurance concerns.

Details regarding U.S. Social Security assumptions and methods can be found in Section II—Table 22.

Executive Summary Matrices

Table 6—Private Canadian Single-Employer Pension Plans

	Accounting	SOLVENCY/Funding
Primary Objective	COMPARABILITY.	SOLVENCY.
Discount Rate	The yield on HIGH-QUALITY corporate Canadian fixed income securities with duration that matches the duration of the pension plan.	For SOLVENCY measurements, use of prescribed rates based on government bond yields and/or annuity purchase rates as applicable. For going-concern valuations, the expected rate of return on plan assets is used without consideration of potential "excess" gains earned from active management (unless the actuary can provide support for inclusion of such above-index returns). Use of provisions for adverse deviation may be appropriate and should be considered when setting all assumptions. Sensitivity analysis showing the liability under a 1 percent change in the discount rate should be included in all solvency and going-concern valuations. Alternatively can use yield based on fixed income securities for going-concern purposes.
Key Characteristics	▪ Liabilities include the cost of future salaries on past service. ▪ Liabilities are measured assuming the company remains in existence as a "going concern." ▪ Liabilities must recognize any known future changes to the plan as well as any substantive commitments, whether written or not, provided by the plan.	SOLVENCY is the primary focus. Valuations primarily focus on measuring liabilities for benefits earned as of the valuation date (past service liabilities without adjustment for future salary increases). Valuations should also consider going-concern funding.
Investment Considerations	▪ Balance sheet and income statement reporting do not reward equity investment risk taking. ▪ Sponsors are considering and in some cases implementing asset/liability matching, annuity purchases, cash flow matching and bond investment.	Excess returns from active management are generally not considered (which effectively discourages active asset management). Passive management gains from investment diversification can be recognized in going-concern valuations (providing some incentive for risk taking) but overriding SOLVENCY requirements limit risk-taking benefit.
Trends	Recognition of "current" price based on fair market/risk-free interest rates.	Continued/strengthened focus on SOLVENCY.

Details regarding Private Canadian Single-Employer Pension Plans assumptions and methods can be found in Section II—Table 23.

Executive Summary Matrices

Table 7—Private Canadian **MULTIEMPLOYER** Pension Plans

	Accounting	**SOLVENCY**/Funding
Primary Objective	**CONTRIBUTION EQUITY.**	**SOLVENCY.**
Discount Rate	No assumption. **MULTIEMPLOYER** costs are reported by contributing employers based on contribution requirements—current as well as required deficit funding payments.	For **SOLVENCY** measurements, use of prescribed rates based on government bond yields and/or annuity purchase rates as applicable. For going-concern valuations the expected rate of return on plan assets is used without consideration of potential "excess" gains earned from active management. Use of provisions for adverse deviation may be appropriate and should be considered when setting the assumption. Sensitivity analysis showing the liability under a 1 percent change in the discount rate should be included in all current valuations. Alternatively can use yield based on fixed income securities.
Key Characteristics	Participating sponsors do not directly report long-term financial risks of plans in most cases, but rather account for the participation in the **MULTIEMPLOYER** plan on a defined-contribution basis. The responsibility for determining funding adequacy and benefit communication rests with plan trustees.	Requirements focus on maintaining **SOLVENCY**—providing sufficient assets to pay promised benefits. Laws allow for benefits to be decreased at plan termination in the case of funding shortfalls.
Investment Considerations	Accounting appears to have no direct effect on investment direction—participating employers report contributions on financial statements.	Law allows the option to reduce benefit enhancements in cases of termination based on funding levels. This allows for continued incentive to take some investment risk (depending on plan participant appetite/acceptance of risk).
Trends	Continued contribution focus. Practice note: IFRS guidance encourages the consideration of defined-benefit-type information as much as possible.	Continued/strengthened focus on **SOLVENCY.**

Details regarding Private Canadian **MULTIEMPLOYER** Pension Plans assumptions and methods can be found in Section II—Table 24.

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Table 8—Canadian Federal Government Pension Plans

	Accounting	SOLVENCY/Funding
Primary Objective	**TRANSPARENCY.**	**SOLVENCY.**
Discount Rate	Discounting of future funding contributions is based on the assumed yield of the plan investment. Public Sector Pension Plan Investment Board (PSPIB) expected rate of return on all types of assets. Assumption should be based on a best estimate of the long-term investment return assumptions on a going-concern basis.	Discounting of future funding contributions is based on the assumed yield of the Pension Fund. PSPIB expected rate of return on all types of assets. Assumption should be based on a best estimate of the long-term investment return assumptions on a going-concern basis.
Key Characteristics	Valuations measure the long term and do not directly reflect risk-free rates or current market conditions. This methodology is allowed to provide for longer-term consistent contributions that recognize that no plan termination is expected.	Valuations measure the long-term and do not directly reflect risk-free rates or current market conditions. This methodology is allowed to provide for longer-term consistent contributions that recognize that no plan termination is expected.
Investment Considerations	Many Canadian government pension plans are employing sophisticated investment principles to improve the long-term benefit of active management.	Many Canadian government pension plans are employing sophisticated investment principles to improve the long-term benefit of active management.
Trends	Recent focus area has been the mortality assumption—both the base tables used and the future improvement projections.	Continued focus on cash flow.

Details regarding Canadian Federal Government Pension Plans assumptions and methods can be found in Section II—Table 25.

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Table 9—Canadian Provincial and Local Pension Plans

	Accounting	SOLVENCY/Funding
Primary Objective	**COMPARABILITY.**	**COST STABILITY.**
Discount Rate	The discount rate is equal to the investment return rate or the borrowing rate for the government entity as applicable (the entity has discretion to select which discount rate is most appropriate for their reporting purposes). Consideration must be given to the inflation component to ensure consistency with salary scale and cost-of-living adjustment (COLA) assumptions.	For SOLVENCY measurements, use of prescribed discount rates based on government bond yields and/or annuity purchase rates as applicable. For going-concern valuations the expected rate of return on plan assets is used without consideration of potential "excess" gains earned from active management. Use of provisions for adverse deviation may be appropriate and should be considered when setting the assumption. Sensitivity analysis showing the liability under a 1 percent change in the discount rate should be included in all current valuations. Alternatively can use yield based on fixed income securities.
Key Characteristics	Generally, funded plans will determine the discount rate based on the expected asset returns, while unfunded plans will be valued based on the sponsor's cost of borrowing (though if a sponsor provides both types of plans then use of the funding discount rate may be allowed for both).	SOLVENCY is the primary focus. Valuations primarily focus on measuring liabilities for current benefits. Valuations should also consider going-concern funding.
Investment Considerations	The investment decisions can impact the discount rate used.	Excess returns from active management are generally not considered (which effectively discourages active asset management). Passive management gains from investment diversification can be recognized in going-concern valuations (providing some incentive for minimal risk taking) but overriding SOLVENCY requirements limit risk-taking benefit.
Trends	Full reporting of all benefit costs—accurate disclosure of promises made.	SOLVENCY primarily.

Details regarding Canadian Provincial and Local Pension Plans assumptions and methods can be found in Section II—Table 26.

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Table 10—Canada Pension Plan and Old Age Security

	Accounting	SOLVENCY/Funding
Primary Objective	Long-term **SOLVENCY.**	**STEADY-STATE FUNDING.**
Discount Rate	The investment earnings expected to be used to provide a portion of expected benefit payments are relevant in the Canada Pension Plan (CPP)/Old Age Security (OAS) open group valuation. The discount rate should be **ACTUARIALLY REASONABLE** based on the invested assets. This assumption is critical in determining present value measurements. Additionally, expectations regarding the investment returns available to provide annual cash flows are factors in determining plan solvency; however, demographic assumptions remain the most critical assumptions in determining the projected annual expected cash flows of the system.	The investment earnings expected to be used to provide a portion of expected benefit payments are relevant in the CPP/OAS open group valuation. The discount rate should be **ACTUARIALLY REASONABLE** based on the invested assets. This assumption is critical in determining present value measurements. Additionally, expectations regarding the investment returns available to provide annual cash flows are factors in determining plan solvency; however, demographic assumptions remain the most critical assumptions in determining the projected annual expected cash flows of the system.
Key Characteristics	**STEADY-STATE FUNDING** (mixed pay-as-you-go/accrual)—goal is to stabilize the ratio of assets to expenditures over time. Any new benefit enhancements enacted in the future must be fully funded by regulation. Regulation calls for actuarial reports every three years with mandated funding and/or benefit changes based on the actuarial report.	**STEADY-STATE FUNDING** (mixed pay-as-you-go/accrual)—goal is to stabilize the ratio of assets to expenditures over time. Any new benefit enhancements enacted in the future must be fully funded by regulation. Regulation calls for actuarial reports every three years with mandated funding and/or benefit changes based on the actuarial report.
Investment Considerations	The relatively recent shift of assets into market securities is a significant change in the allowed investments (based on an Act of Parliament in 1997 with the first market investments occurring in 1999). Coupled with **STEADY-STATE FUNDING** investment diversification is a developing concept.	The relatively recent shift of assets into market securities is a significant change in the allowed investments (based on an Act of Parliament in 1997 with the first market investments occurring in 1999). Coupled with **STEADY-STATE FUNDING** investment diversification is a developing concept.
Trends	**SOLVENCY**—unique shift to **STEADY-STATE FUNDING** for social insurance program. The invested assets of the program are expected to grow substantially in coming years.	**SOLVENCY**—unique shift to **STEADY-STATE FUNDING** for social insurance program.

Details regarding Canada Pension Plan and Old Age Security assumptions and methods can be found in Section II—Table 27.

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Table 11—Comparison of Private Single-Employer Accounting—United States versus Canada

	United States	Canada
Primary Objective	**COMPARABILITY.**	**COMPARABILITY.**
Discount Rate	**HIGH-QUALITY** corporate bonds The rate of return on a hypothetical portfolio of **HIGH-QUALITY** fixed income securities that generate cash flows matching the expected amount and timing of payments from the pension plan.	The yield on **HIGH-QUALITY** corporate Canadian fixed income securities with duration that matches the liability duration.
Key Characteristics	▪ Liabilities include the cost of future salaries on past service. ▪ Liabilities are measured assuming the company remains in existence as a "going concern." ▪ Liabilities must recognize any known future changes to the plan as well as any substantive commitments, whether written or not, provided by the plan.	▪ Liabilities include the cost of future salaries on past service. ▪ Liabilities are measured assuming the company remains in existence as a "going concern." ▪ Liabilities must recognize any known future changes to the plan as well as any substantive commitments, whether written or not, provided by the plan.
Investment Considerations	▪ Balance sheet requirements do not reward equity investment risk taking. ▪ Income statement accounting provides reward for equity investment risk taking ▪ Sponsors are considering and in some cases implementing asset/liability matching, cash flow matching and bond investment; however, most pension plans still include equities in plan assets.	▪ Balance sheet and income statement reporting do not reward equity investment risk taking. ▪ Sponsors are considering and in some cases implementing asset/liability matching, cash flow matching and bond investment.
Trends	Recognition of market prices on the valuation date based on current market conditions. Possible convergence with IFRS/IAS 19.	Recognition of "current" price based on fair market/risk-free interest rates.

Observation: The most significant difference between actuarial measurements under U.S. GAAP and Canadian GAAP/IAS is the discount rate. U.S. GAAP requires development of a hypothetical portfolio of **HIGH-QUALITY** fixed income securities that replicate cash flow. Selection of above median fixed income securities is acceptable in developing these portfolios. Canadian GAAP requires use of **HIGH-QUALITY** bond yield for a duration that matches the pension plan's duration. No selection of specific subsets of the fixed income market is available in selecting the bond yield.

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Table 12—Comparison of U.S. Federal versus State and Local Funding

	Federal	State and Local
Primary Objective	**COST STABILITY.**	**COST STABILITY.**
Discount Rate	The discount rate is equal to the expected rate of return on investments. This rate is currently based on the 40-quarters (10-year) historical average return (investments are in government bonds; therefore, this discount rate is government yields). Consideration should be given to the timing of the liabilities relative to the interest rates on investments of matching maturities per written FASAB guidance (see SFFAS 5 paragraph 66 and SFFAS 33 paragraph 28). All assumptions are reviewed with the Board of Actuaries (for those plans where the Board of Actuaries is involved).	Generally specified in state or local statute; usually intended to reflect the expected rate of return on plan assets. Often the assumption cannot be changed without sponsor approval (a plan sponsor prescribed assumption versus assumptions selected by the actuary or separate authority like the IRS).
Key Characteristics	Funding is based on regulatory mandates. Funding for new participants recognizes actuarial costs. Funding for old liabilities and participants (e.g., CRS) may be made according to schedules that do not directly recognize actuarial costs.	Funding may follow regulatory mandate (fixed employer contribution rate). Some legislation directly recognizes actuarial costs and adjusts funding regularly. Some legislation does not directly link to actuarial costs.
Investment Considerations	Not applicable—the plans are mandated to invest in government securities.	The allowance in statutes to set funding level without strict link to actuarial costs can result in no direct incentive for conservative investments—if costs can be made up with asset returns there is less direct impact on taxpayers. Likewise, if investments decline in value there is more direct impact on taxpayers.
Trends	Continued focus on cash flow adequacy. Public discussion of federal pension programs has increased but continues to be secondary to the discussion regarding state and local programs. Funding challenges are prompting more discussion about long-term plan sustainability for programs such as the military pension program.	Extreme scrutiny of public pension plan funding/reporting measurement. Challenges with reporting and funding levels are front-page news.

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Table 13—Comparison of Canadian Federal versus Provincial and Local Funding

	Federal	Provincial and Local
Primary Objective	**SOLVENCY.**	**COST STABILITY.**
Discount Rate	Discounting of future funding contributions is based on the assumed yield of the Pension Fund. PSPIB expected rate of return on all types of assets. Assumption should be based on a best estimate of the long-term investment return assumptions on a going-concern basis.	For SOLVENCY measurements, use of prescribed discount rates based on government bond yields and/or annuity purchase rates as applicable. For going-concern valuations the expected rate of return on plan assets is used without consideration of potential "excess" gains earned from active management. Use of provisions for adverse deviation may be appropriate and should be considered when setting the assumption. Sensitivity analysis showing the liability under a 1 percent change in the discount rate should be included in all current valuations. Alternatively can use yield based on fixed income securities.
Key Characteristics	Valuations measure the long-term and do not directly reflect risk-free rates or current market conditions. This methodology is allowed to provide for longer-term consistent contributions that recognize that no plan termination is expected.	SOLVENCY is the primary focus. Valuations primarily focus on measuring liabilities for current benefits. Valuations should also consider going-concern funding.
Investment Considerations	Many Canadian government pension plans are employing sophisticated investment principles to improve the long-term benefit of active management.	Excess returns from active management are generally not considered (which effectively discourages active asset management). Passive management gains from investment diversification can be recognized in going-concern valuations (providing some incentive for minimal risk taking) but overriding SOLVENCY requirements limit risk-taking benefit.
Trends	Continued focus on cash flow.	SOLVENCY primarily.

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Table 14—Comparison of U.S. Funding by Program

	Private Single	MULTIEMPLOYER	State & Local Government	Social Security
Objective	SOLVENCY	SOLVENCY	COST STABILITY	SUSTAINABLE SOLVENCY
Discount Rate	The IRS publishes rates for valuations based on INVESTMENT GRADE corporate bonds, with considerations of a corridor to consider historical 25-year averages of these rates.	ACTUARIALLY REASONABLE, reflecting plan investments.	Generally specified in state or local statute; usually intended to reflect the expected rate of return on plan assets. Often the assumption cannot be changed without sponsor or trustee approval.	Investment in government bonds is mandated. The expected return on bonds that will be used for benefits is considered.
Key Characteristics	Funding valuation requires consideration of current market conditions but permits additional tax-favored prefunding opportunities for future liabilities. Only accrued benefits are considered.	Valuations allow for longer-term actuarial smoothing of contributions. Recognition of SOLVENCY is included on a long-term basis.	Funding may follow regulatory mandate (fixed employer contribution rate). Some legislation directly recognizes actuarial costs and adjusts funding regularly. Some legislation does not directly link to actuarial costs.	Funding and benefit levels are determined by legislation. Actuarial valuations do not currently show SUSTAINABLE SOLVENCY under current program provisions.
Investment Considerations	Regulation reduces the short-term benefit of equity investment. The increased volatility of funding resulting from equity investment is only minimally offset by the benefit of increased returns (and there is delay in that recognition).	Possibility of withdrawal liabilities and increased annual contribution, especially resulting from PPA MULTIEMPLOYER "endangered/critical" status reports that put pressure on joint trustees to solve underfunding issues.	The allowance in statutes to set funding level without strict link to actuarial costs can result in no direct incentive for conservative investments Investment returns can have a direct impact on taxpayers.	Investment in government bonds is mandated.

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Trends	Recognition of market prices on the valuation date based on current market.	Continued contribution focus with increased consideration of **SOLVENCY.**	Extreme scrutiny of public pension plan funding/reporting measurement. Challenges with reporting and funding levels are front-page news. Debate over level budgeting needs versus solvency considerations.	Sustained **SOLVENCY.**

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Table 15—Comparison of Canadian Funding by Program

	Private Single	MULTIEMPLOYER	Provincial & Local Government	CPP/OAS
Objective	SOLVENCY	SOLVENCY	COST STABILITY	STEADY-STATE FUNDING
Discount Rate	For SOLVENCY measurements, use of prescribed discount rates based on government bond yields and/or annuity purchase rates. For going-concern valuations the expected rate of return on plan assets is used with limited consideration of potential "excess" gains earned from active management.	SOLVENCY valuations prescribed discount rates based on government bond yields and/or annuity purchase rates as applicable. Going-concern valuations the expected rate of return on plan assets without consideration of "excess" gains from active management.	SOLVENCY valuations prescribed discount rates based on government bond yields and/or annuity purchase rates as applicable. Going-concern valuations the expected rate of return on plan assets without consideration of "excess" gains from active management.	The investment earnings expected to be used to provide a portion of expected benefit payments are relevant in the CPP/OAS open group valuation.
Key Characteristics	Valuations primarily focus on measuring liabilities for benefits earned as of the valuation date (past service liabilities without adjustment for future salary increases).	Requirements focus on maintaining SOLVENCY—providing sufficient assets to pay promised benefits. Benefits can be decreased at plan termination.	SOLVENCY is the primary focus. Valuations primarily focus on measuring liabilities for current benefits. Valuations should also consider going-concern funding.	STEADY-STATE FUNDING (mixed pay-as-you-go/accrual)—goal is to stabilize the ratio of assets to expenditures over time.
Investment Considerations	Passive management gains from investment diversification can be recognized in going-concern valuations but overriding SOLVENCY requirements limit risk-taking benefit.	Law allows the option to reduce benefit enhancements in cases of termination based on funding levels. This allows for continued incentive to take some investment risk (depending on plan participant appetite/acceptance of risk).	Active asset management is effectively discouraged. Passive management gains from investment diversification can be recognized in going-concern valuations (providing some incentive for minimal risk taking).	The relatively recent shift of assets into market securities is a significant change in the allowed investments. Coupled with STEADY-STATE FUNDING investment diversification is a developing concept.
Trends	Continued/strengthened focus on SOLVENCY.	Continued/strengthened focus on SOLVENCY.	SOLVENCY primarily.	SOLVENCY—unique shift to STEADY-STATE FUNDING for social insurance program.

Executive Summary Matrices

Table 16—Comparison of Canadian Provincial and Local Funding versus U.S. State and Local Funding

	Canada	United States
Primary Objective	**COST STABILITY.**	**COST STABILITY.**
Discount Rate	For SOLVENCY measurements, use of prescribed discount rates based on government bond yields and/or annuity purchase rates as applicable. For going-concern valuations the expected rate of return on plan assets is used without consideration of potential "excess" gains earned from active management. Use of provisions for adverse deviation may be appropriate and should be considered when setting the assumption. Sensitivity analysis showing the liability under a 1 percent change in the discount rate should be included in all current valuations. Alternatively can use yield based on fixed income securities.	Generally specified in state or local statute; usually intended to reflect the expected rate of return on plan assets. Often the assumption cannot be changed without sponsor approval (a prescribed assumption).
Key Characteristics	SOLVENCY is the primary focus. Valuations primarily focus on measuring liabilities for current benefits. Valuations should also consider going-concern funding.	Funding may follow regulatory mandate (fixed employer contribution rate). Some legislation directly recognizes actuarial costs and adjusts funding regularly. Some legislation does not directly link to actuarial costs.
Investment Considerations	Excess returns from active management are generally not considered (which effectively discourages active asset management). Passive management gains from investment diversification can be recognized in going-concern valuations (providing some incentive for minimal risk taking) but overriding SOLVENCY requirements limit risk-taking benefit.	The allowance in statutes to set funding level without strict link to actuarial costs can result in no direct incentive for conservative investments—if costs can be made up with asset returns there is less direct impact on taxpayers. Likewise, if investments decline in value there is more direct impact on taxpayers.
Trends	SOLVENCY primarily.	Extreme scrutiny of public pension plan funding/reporting measurement. Challenges with reporting and funding levels are front-page news.

Executive Summary Matrices

Table 17—Comparison of Canada Pension Plan versus U.S. Social Security

	CPP/OAS	Social Security
Primary Objective	STEADY-STATE FUNDING.	SUSTAINABLE SOLVENCY.
Discount Rate	The investment earnings expected to be used to provide a portion of expected benefit payments are relevant in the CPP/OAS open group valuation. The discount rate should be ACTUARIALLY REASONABLE based on the invested assets. This assumption is critical in determining present value measurements. Additionally, expectations regarding the investment returns available to provide annual cash flows are a factor in determining plan solvency; however, demographic assumptions remain the most critical assumptions in determining the projected annual expected cash flows of the system.	The investment earnings expected to be used to provide a portion of expected benefit payments are relevant in the Social Security open group valuation. The discount rate should be ACTUARIALLY REASONABLE based on the invested assets. This assumption is critical in determining present value measurements. Additionally, expectations regarding the investment returns available to provide annual cash flows are a factor in determining plan solvency; however, demographic assumptions remain the most critical assumptions in determining the projected annual expected cash flows of the system.
Key Characteristics	STEADY-STATE FUNDING (mixed pay-as-you-go/accrual)—goal is to stabilize the ratio of assets to expenditures over time. Any *new* benefit enhancements enacted in the future must be fully funded by regulation. Regulation calls for actuarial reports every three years with mandated funding and/or benefit changes based on the actuarial report.	Funding and benefit levels are determined by legislation. Actuarial valuations do not currently show SUSTAINABLE SOLVENCY under current program provisions. Goal for SUSTAINABLE SOLVENCY is explicitly recognized, and measurements and studies are done regularly to refine actuarial measurement subject to current market conditions.
Investment Considerations	The relatively recent shift of assets into market securities is a significant change in the allowed investments (based on an Act of Parliament in 1997 with the first market investments occurring in 1999). Coupled with STEADY-STATE FUNDING investment diversification is a developing concept.	Not applicable—mandated investment in government securities.
Trends	SOLVENCY—unique shift to STEADY-STATE FUNDING for social insurance program.	SUSTAINABLE SOLVENCY—recognition of unsustainable trend line under current program provisions and economic realities. Active debate regarding program is taking a backseat to Medicare/ hospital insurance concerns.

Section II

Detailed Matrices

Table 18—Private U.S. Single-Employer Pension Plans

	Accounting[1]	PBGC PREMIUMS & TERMINATION	Funding
Objective	**COMPARABILITY**	**SOLVENCY**	**SOLVENCY**
Method	Sponsor reporting—projected unit credit. Plan reporting—unit credit. Regulation: FASB 715, 960. Professional: Actuarial Standard of Practice (ASOP) 4.	Unit credit—vested benefits. Regulation: IRC Section 417 for lump sum calculations, U.S. Code 1362 for PBGC liability on plan termination, U.S. Code 1306 for **PBGC PREMIUM** Liability Determination (Title IV of ERISA). Professional: ASOP 4.	Unit credit. Use salaries projected forward one year for normal cost. Regulation: IRC 430. Professional: ASOP 4.
Method—Assets	Sponsor reporting—market value. Market-related value is generally permitted; smooth gains over no more than five years. Practice note: Use of market value is required for measuring balance sheet liability; market related value can only be used to measure the expected return on plan assets and gain/loss used in income statement recognition. Consideration should be given to applying a corridor (for example 80 to 120 percent of market value) to ensure that market-related values do not vary too significantly from current market values. Plan reporting—market value of assets. Regulation: FASB 715, 960. Professional: ASOPs 4, 44.	All PBGC premium & termination calculations are based on current value of assets—no smoothing is considered. Discounted contributions attributable to prior years may be included. Regulation: ERISA Title IV. Professional: ASOPs 4, 44.	Generally, market value; smoothing of asset gains is acceptable over a period of no more than two years. Actuarial value of assets can be no more than 110 percent or less than 90 percent of the market value of assets. Discounted contributions attributable to prior years may be included. Regulation: IRC 430. Professional: ASOPs 4, 44.
Discount Rate	Sponsor reporting—The rate of return on a hypothetical portfolio of **HIGH-QUALITY** fixed income securities that generate cash flows that match the expected amount and timing of payments from the pension plan. Plan level accounting—**ACTUARIALLY REASONABLE**.	The IRS publishes rates based on **INVESTMENT GRADE** corporate bonds for termination liability calculations. The PBGC publishes rates based on corporate bond yields for premium liability calculations. Regulation: IRC 417(e)(3), 29 CFR 4006. Professional: ASOPs 4, 27.	The IRS publishes rates based on **INVESTMENT GRADE** corporate bonds for termination liability calculations. Legislation passed in 2012 and 2014 calls for a corridor to be applied to current yields to consider historical 25-year averages of these rates. Regulation: IRC 417(e)(3), 29 CFR 4006.

	Regulation: FASB 715. Professional: ASOPs 4, 27.		Professional: ASOPs 4, 27.

Detailed Matrices

Table 18—Private U.S. Single-Employer Pension Plans—Continued

	Accounting[1]	**PBGC PREMIUMS & TERMINATION**	Funding
Investment Return	Sponsor reporting—The investment return rate should reflect the expected return on the plan investments. This assumption does not have any effect on the liability measurement—only on the recognition of pension expense through income statements. Plan level reporting—not applicable. Regulation: FASB 715. Professional: ASOPs 4, 27.	No explicit assumption—All PBGC premium & termination calculations are based on current value of assets; no future investment return increases are considered. Regulation: ERISA Title IV. Professional: ASOPs 4, 27.	No effect on the calculation of the minimum or maximum deductible contributions. Should be considered by the actuary in recommending annual contribution level. Regulation: IRC 430. Professional: ASOPs 4, 27.
Salary Scale	Sponsor reporting—Liability and normal cost measurement should include the effect of expected salary increases. Plan level reporting—No salary scale is applicable (unit credit funding method). Regulation: FASB 715. Professional: ASOPs 4, 27.	Measurement for plan termination purposes should NOT include salary increases on earned benefits—lump sums are not required to factor in future potential salary increases on service earned. (PBGC does not insure future salary increases on service earned to date.) Regulation: ERISA Title IV. IRC 417(e)(3), 436. Professional: ASOPs 4, 35.	Must be **ACTUARIALLY REASONABLE**, reflecting plan provisions and expected behavior. Salary scales that would increase benefits above current maximum limitations CANNOT be considered in current funding (even if in reality they will become payable upon an eventual increase in the limit). For maximum tax deduction calculations, all future salary increases can be considered. Regulation: IRC 430, 404. Professional: ASOPs 4, 27.
Cost-of-Living Adjustment	Must be **ACTUARIALLY REASONABLE**, reflecting plan provisions and expected behavior. Explicit recognition of COLAs, written or substantive, must be included in liability. Practice note: automatic or regular ad hoc COLAs are uncommon in private U.S. pension plans. Regulation: FASB 715. Professional: ASOPs 4, 35.	Measurement for plan termination purposes must be **ACTUARIALLY REASONABLE**, reflecting plan provisions and expected behavior—if COLAs are provided, termination payments must include payment for COLA. Liability calculations for premium payments should NOT include COLAs. (PBGC does not provide COLAS.) Regulation: ERISA Title IV. IRC 417(e)(3), 436. Professional: ASOPs 4, 35.	Must be **ACTUARIALLY REASONABLE**, reflecting plan provisions and expected behavior. COLAs that increase benefits above current maximum limitations CANNOT be considered in current funding (even if in reality they will become payable upon an eventual COLA increase in the limit). Future expected increases in benefit levels can be considered based on the average increases over prior six plan years)

			Regulation: IRC 430, 404. Professional: ASOPs 4, 27.

Section II

Detailed Matrices

Table 18—Private U.S. Single-Employer Pension Plans—Continued

	Accounting[1]	**PBGC PREMIUMS & TERMINATION**	Funding
Mortality	Must be **ACTUARIALLY REASONABLE**, reflecting plan provisions and expected behavior. Practice note: Current debate in practice surrounds the inclusion of mortality improvements in valuation, both through the date of valuation as well as future mortality improvements after the valuation date. Regulation: FASB 715. Professional: ASOPs 4, 35.	Measurement for plan termination purposes based on IRS published mortality tables. These mortality tables are based on Society of Actuaries (SOA) developed RP2000 with AA projection currently and will be updated by the IRS. Liability calculation for premium payments is based on PBGC published mortality. Regulation: ERISA Title IV. IRC 417(e)(3). Professional: ASOPs 4, 35.	Mortality tables published by the IRS (currently based on SOA developed RP2000 with AA projection) with updates forthcoming. Plan sponsors, with advice of actuary, can choose alternative mortality tables. In rare circumstances plan-specific mortality may be considered with regulator approval. Practice note: Plan-specific mortality is very rarely applied for—at the time of the drafting of this matrix, based on comments at actuarial meetings, only four plan-specific tables have been approved as of 2010. Regulation: IRC 430. Professional: ASOPs 4, 35.
Retirement	Must be **ACTUARIALLY REASONABLE**, reflecting plan provisions and expected behavior. Explicit recognition of early retirement subsidies, written or substantive, must be included in liability. Regulation: FASB 715. Professional: ASOPs 4, 35.	Measurement for plan termination purposes must be **ACTUARIALLY REASONABLE**, reflecting plan provisions and expected behavior. Liability for premium payments is based on the plan's normal retirement age. Regulation: ERISA Title IV. IRC 417(e)(3), 436. Professional: ASOPs 4, 35.	Must be **ACTUARIALLY REASONABLE**, reflecting plan provisions and expected behavior. Regulation: IRC 430. Professional: ASOPs 4, 35.
Termination	Must be **ACTUARIALLY REASONABLE**, reflecting plan provisions and expected behavior; depending on plan circumstances explicit assumption may not be required. Regulation: FASB 715. Professional: ASOPs 4, 35.	Not applicable—generally when a private U.S. pension plan terminates no benefits are paid for future instances of employment termination. Participants receive either annuity or lump sum payments to cover promised benefits.	Must be **ACTUARIALLY REASONABLE**, reflecting plan provisions and expected behavior. Regulation: IRC 430. Professional: ASOPs 4, 35.
Disability	Must be **ACTUARIALLY REASONABLE**, reflecting plan provisions and expected behavior; depending on plan circumstances explicit assumption may not be required. Regulation: FASB 715. Professional: ASOPs 4, 35.	Not applicable—generally when a private U.S. pension plan terminates no benefits are paid for future instances of disability. Current disabled participants receive either annuity or lump sum payments to cover promised benefits.	Must be **ACTUARIALLY REASONABLE**, reflecting plan provisions and expected behavior. Regulation: IRC 430. Professional: ASOPs 4, 35.

Detailed Matrices

Table 18—Private U.S. Single-Employer Pension Plans—Continued

	Accounting[1]	**PBGC PREMIUMS & TERMINATION**	Funding
Form of Payment	Must be **ACTUARIALLY REASONABLE**, reflecting plan provisions and expected behavior. Regulation: FASB 715. Professional: ASOPs 4, 35.	Only annuity benefits are subject to PBGC insurance coverage. Measurement for plan termination purposes must be **ACTUARIALLY REASONABLE**, reflecting plan provisions and expected behavior. Regulation: ERISA Title IV. IRC 417(e)(3), 436. Professional: ASOPs 4, 35.	Must be **ACTUARIALLY REASONABLE**, reflecting plan provisions and expected behavior. Regulation: IRC 430. Professional: ASOPs 4, 35.
Service Recognition	Liability includes past service earned by participants up to the measurement date; normal cost is the present value of benefits accrued in the current plan year.	ONLY vested past service earned by participants up to the measurement date is recognized.	Liability includes past service earned by participants up to the measurement date; normal cost is the present value of benefits accrued in the current plan year.
Salary Effects on Service	All future salary effects recognized immediately with the service accrued as of the measurement date. For plan level reporting—not applicable.	No consideration of future salaries on benefits earned.	Current year salary effects recognized in normal cost.

[1] Unless specifically noted elsewhere, plan level reporting follows the guidance for sponsor level reporting.

Web Links:
ASOP 4 link:
http://www.actuarialstandardsboard.org/pdf/asops/asop004_107.pdf
ASOP 4 update:
http://www.actuarialstandardsboard.org/pdf/asops/asop004_173.pdf
ASOP 27 link:
http://www.actuarialstandardsboard.org/pdf/asops/asop027_109.pdf
ASOP 27 update:
http://www.actuarialstandardsboard.org/pdf/asops/asop027_172.pdf
ASOP 35:
http://www.actuarialstandardsboard.org/pdf/asops/asop035_118.pdf
ASOP 44:
http://www.actuarialstandardsboard.org/pdf/asops/asop044_116.pdf
IRC 401-436:
http://www.law.cornell.edu/uscode/html/uscode26/usc_sup_01_26_10_A_20_1_30_D.html
ERISA Title IV:
http://www.law.cornell.edu/uscode/text/29/chapter-18/subchapter-III
29 CFR 4006:
http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?c=ecfr&tpl=/ecfrbrowse/Title29/29cfr4006_main_02.tpl
FASB:
http://asc.fasb.org/topic&trid=2235017&nav_type=left_nav&analyticsAssetName=home_page_left_nav_topic
—must be a registered user—registration is free
RP-2014 Mortality Table:
https://www.soa.org/Research/Experience-Study/pension/research-2014-rp.aspx

Detailed Matrices

Table 19—Private U.S. **MULTIEMPLOYER** Pension Plans

	Accounting	**PBGC PREMIUMS & TERMINATION**	Funding
Primary Objective	"Fairness"—cash flow.	"Fairness"—cash flow.	**SOLVENCY.**
Method	No method—All **MULTIEMPLOYER** costs are reported by contributing employers based on contribution—current as well as required **WITHDRAWAL LIABILITY** payments. Regulation: FASB 715-80. Professional: Nothing specific/ambiguous.	Fixed **PBGC PREMIUM** based on head count only—no relation between benefits promised and premiums charged. (PBGC insurance is provided based on benefits promised—guarantees are modest related to promises and maximum benefits for single-employer plans.) In the case of a mass withdrawal, a **SOLVENCY** valuation is completed using mandatory assumptions to determine mass **WITHDRAWAL LIABILITY** for contributing employers. Regulation: Not applicable—fixed based on participant count only for premiums. ERISA 4281 regulations summarize required assumptions. Professional: Nothing specific/ambiguous.	Unit credit to determine the plan's funded status. Any **ACTUARIALLY REASONABLE** funding methods may be used to determine annual required participating employer contributions. Note that actual contributions are determined by the terms of the collective bargaining agreements. Regulation: IRC 431/432. Professional: ASOP 4.
Method—Assets	Not applicable—All **MULTIEMPLOYER** costs are reported by contributing employers based on contribution requirements—current as well as required **WITHDRAWAL LIABILITY** payments. In effect this is market value reporting. Regulation: FASB 715-80. Professional: Nothing specific/ambiguous.	Fixed **PBGC PREMIUM** based on head count only—no relation between benefits promised and premiums charged. (PBGC insurance provided based on benefits promised—guarantees are modest related to promises and maximum benefits guaranteed for single-employer plans.) Withdrawal liability calculations are based on smoothed assets or market value of assets (use of smoothed assets is most common in practice). Regulation: Not applicable—fixed based on participant count only. Professional: Nothing specific/ambiguous.	Any reasonable actuarial valuation method that takes into account fair market value. Regulation: IRC 431. Professional: ASOPs 4, 44.

Detailed Matrices

Table 19—Private U.S. **MULTIEMPLOYER** Pension Plans—Continued

	Accounting	**PBGC PREMIUMS & TERMINATION**	Funding
Discount Rate	No assumption—not applicable. **MULTIEMPLOYER** costs are reported by contributing employers based on contribution requirements—current as well as required **WITHDRAWAL LIABILITY** payments. Regulation: FASB 715-80. Professional: Nothing specific/ambiguous.	Fixed **PBGC PREMIUM** based on head count only—no relation between benefits promised and premiums charged. (PBGC insurance provided based on benefits promised—guarantees are modest related to promises and maximum benefits guaranteed for single-employer plans.) The PBGC publishes interest rates that approximately replicate annuity purchase rates that may be used for **WITHDRAWAL LIABILITY** calculations. Regulation: not applicable—fixed based on participant count only. Professional: Nothing specific/ambiguous.	Mandated for current liability calculations (for determining plan's funded status) using the average return on 30-year Treasurys over the four-year period ending on the last day before the beginning of the plan year. For purposes of determining annual funding under plan's selected method—**ACTUARIALLY REASONABLE**. Regulation: IRC 431, 29 CFR 4281/4044. Professional: ASOPs 4, 27.
Investment Return	No assumption—not applicable. **MULTIEMPLOYER** costs are reported by contributing employers based on contribution cash flow requirements—current as well as required **WITHDRAWAL LIABILITY** payments. Regulation: FASB 715-80. Professional: Nothing specific/ambiguous.	Fixed **PBGC PREMIUM** based on head count only—no relation between benefits promised and premiums charged. (PBGC insurance provided based on benefits promised—guarantees are modest related to promises and maximum benefits guaranteed for single-employer plans.) Regulation: Not applicable. Professional: Nothing specific/ambiguous.	For purposes of determining annual funding under plan's selected method—**ACTUARIALLY REASONABLE**. Practice note: Discount rates intended to replicate annuity purchase rates are available from the PBGC and Department of Labor for actuaries and plan sponsors to use in determining **WITHDRAWAL LIABILITY** calculations, though many plans rely on the valuation rate for determining withdrawal liabilities. Regulation: IRC 431, 29 CFR 4281/4044. Professional: ASOPs 4, 27.
Salary Scale	No assumption—not applicable. **MULTIEMPLOYER** costs are reported by contributing employers based on contribution requirements—current as well as required **WITHDRAWAL LIABILITY** payments. Regulation: FASB 715-80. Professional: Nothing specific/ambiguous.	Fixed **PBGC PREMIUM** based on head count only—no relation between benefits promised and premiums charged. (PBGC insurance provided based on benefits promised—guarantees are modest related to promises and maximum benefits guaranteed for single-employer plans.) Regulation: Not applicable. Professional: Nothing specific/ambiguous.	**ACTUARIALLY REASONABLE**, reflecting plan provisions and expected behavior. Salary scales that would increase benefits above current maximum limitations CANNOT be considered in current funding Practice note: Most **MULTIEMPLOYER** plans do not base benefits on compensation; therefore, salary scale is not applicable in most cases.

			Regulation: IRC 431, 404. Professional: ASOPs 4, 35.

Detailed Matrices

Table 19—Private U.S. **MULTIEMPLOYER** Pension Plans—Continued

	Accounting	**PBGC PREMIUMS & TERMINATION**	Funding
Cost-of-Living Adjustment	No assumption—not applicable. **MULTIEMPLOYER** costs are reported by contributing employers based on contribution requirements—current as well as required **WITHDRAWAL LIABILITY** payments. Regulation: FASB 715-80. Professional: Nothing specific/ambiguous.	Fixed **PBGC PREMIUM** based on head count only—no relation between benefits promised and premiums charged. (PBGC insurance provided based on benefits promised—guarantees are modest related to promises and maximum benefits guaranteed for single-employer plans.) Regulation: Not applicable Professional: Nothing specific/ambiguous.	**ACTUARIALLY REASONABLE**, reflecting plan provisions and expected behavior. COLAs that would increase benefits above current maximum limitations CANNOT be considered in current funding (even if in reality they will become payable upon an eventual COLA increase in the limit). For maximum tax-deductible liability calculations, future expected increases in benefit levels can be considered based on the average annual increase over the previous six plan years) Practice note: Automatic, or regular ad hoc COLAs are uncommon in private U.S. **MULTIEMPLOYER** plans. Regulation: IRC 431, 404. Professional: ASOPs 4, 35.
Mortality	No assumption—not applicable. **MULTIEMPLOYER** costs are reported by contributing employers based on contribution requirements—current as well as required **WITHDRAWAL LIABILITY** payments. Regulation: FASB 715-80. Professional: Nothing specific/ambiguous.	Fixed **PBGC PREMIUM** based on head count only—no relation between benefits promised and premiums charged. Regulation: Not applicable. Professional: Nothing specific/ambiguous.	Mortality tables published by the IRS for calculating current liability and mass **WITHDRAWAL LIABILITY**—94GAM projected using scale AA (used for PBGC 4044 purposes). Annual funding requirement under plan's selected method must be **ACTUARIALLY REASONABLE**. Regulation: IRC 431, ERISA 4281. Professional: ASOPs 4, 35.
Retirement	No assumption—not applicable. **MULTIEMPLOYER** costs are reported by contributing employers based on contribution requirements—current as well as required **WITHDRAWAL LIABILITY** payments. Regulation: FASB 715-80. Professional: Nothing specific/ambiguous.	Fixed **PBGC PREMIUM** based on head count only—see additional notes under other **MULTIEMPLOYER** assumptions noted previously. Regulation: Not applicable Professional: Nothing specific/ambiguous.	**ACTUARIALLY REASONABLE**, reflecting plan provisions and expected behavior. Regulation: IRC 431. Professional: ASOPs 4, 35.

Section II

Detailed Matrices

Table 19—Private U.S. MULTIEMPLOYER Pension Plans—Continued

	Accounting	PBGC PREMIUMS & TERMINATION	Funding
Termination	No assumption—not applicable. MULTIEMPLOYER costs are reported by contributing employers based on contribution requirements—current as well as required WITHDRAWAL LIABILITY payments. Regulation: FASB 715-80. Professional: Nothing specific.	Fixed PBGC PREMIUM based on head count only—see additional notes under other MULTIEMPLOYER assumptions noted previously. Regulation: Not applicable Professional: Nothing specific/ambiguous.	ACTUARIALLY REASONABLE, reflecting plan provisions and expected behavior. Regulation: IRC 431. Professional: ASOPs 4, 35.
Disability	No assumption—not applicable. MULTIEMPLOYER costs are reported by contributing employers based on contribution requirements—current as well as required WITHDRAWAL LIABILITY payments. Regulation: FASB 715-80. Professional: Nothing specific.	Fixed PBGC PREMIUM based on head count only—see additional notes under other MULTIEMPLOYER assumptions noted previously. Regulation: Not applicable. Professional: Nothing specific/ambiguous.	ACTUARIALLY REASONABLE, reflecting plan provisions and expected behavior. Regulation: IRC 431. Professional: ASOPs 4, 35.
Form of Payment	No assumption—not applicable. MULTIEMPLOYER costs are reported by contributing employers based on contribution requirements—current as well as required WITHDRAWAL LIABILITY payments. Regulation: FASB 715-80. Professional: Nothing specific.	Fixed PBGC PREMIUM based on head count only—see additional notes under other MULTIEMPLOYER assumptions noted previously. Regulation: Not applicable. Professional: Nothing specific/ambiguous.	ACTUARIALLY REASONABLE, reflecting plan provisions and expected behavior. Regulation: IRC 431. Professional: ASOPs 4, 35.
Service Recognition	Not applicable.	Not applicable.	Funding method allows flexibility in assignment of costs to current, future, or prior periods, subject to ACTUARIALLY REASONABLE methods. Professional: ASOP 4.
Salary Effects on Service	Not applicable.	Not applicable.	Generally not applicable for MULTIEMPLOYER plans. To the extent benefits are tied to compensation the consideration of salary increases on earned service must be reasonable under the actuarial funding method. Professional: ASOP 4.

Detailed Matrices

Table 19—Private U.S. **Multiemployer** Pension Plans—Continued

Web Links:

ASOP 4 link:
http://www.actuarialstandardsboard.org/pdf/asops/asop004_107.pdf
ASOP 4 update:
http://www.actuarialstandardsboard.org/pdf/asops/asop004_173.pdf
ASOP 27 link:
http://www.actuarialstandardsboard.org/pdf/asops/asop027_109.pdf
ASOP 27 update:
http://www.actuarialstandardsboard.org/pdf/asops/asop027_172.pdf
ASOP 35:
http://www.actuarialstandardsboard.org/pdf/asops/asop035_118.pdf
ASOP 44:
http://www.actuarialstandardsboard.org/pdf/asops/asop044_116.pdf
IRC 401-436:
http://www.law.cornell.edu/uscode/html/uscode26/usc_sup_01_26_10_A_20_1_30_D.html
29 CFR 4044:
http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?c=ecfr&tpl=/ecfrbrowse/Title29/29cfr4044_main_02.tpl
29 CFR 4281:
http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?c=ecfr&tpl=/ecfrbrowse/Title29/29cfr4281_main_02.tpl
FASB:
http://asc.fasb.org/topic&trid=2235017&nav_type=left_nav&analyticsAssetName=home_page_left_nav_topic
—must be a registered user—registration is free

Section II

Detailed Matrices

Table 20—U.S. Federal Government Pension Plans

	Accounting	SOLVENCY/Funding
Primary Objective	TRANSPARENCY.	Generally, COST STABILITY. Federal Employees Retirement System (FERS) program inherently recognizes some need for SOLVENCY.
Method	Entry age normal to determine dynamic unfunded actuarial liability and normal costs. Present value of accrued benefits is also calculated using unit credit cost method. The regulations specifically reference the professional regulations for assumption setting detailed in ASOP 4. Regulation: 5 USC 8347 and SFFAS 33, Professional: ASOP 4.	Funding for Civil Service Retirement System (CSRS) is determined according to statute—contribution level from employees and employing agencies is set by statute with supplemental contributions from the U.S. Treasury to provide for shortfalls and interest. No SOLVENCY valuation is required as there is no provision to terminate the plan. FERS funding recognizes actuarial cost under entry age normal cost method—agencies contribute the difference between normal cost and employee contribution (7 percent). The U.S. Treasury makes a payment for any actuarial shortfall amortization. Regulation: 5 USC 8334 and 5 CFR 831.111 and Chapter 84 of 5 USC. Professional: ASOP 4.
Method—Assets	Market value—all held in government securities. Regulation: SFFAS 33. Professional: ASOPs 4, 27.	Market value—all held in government securities. Professional: ASOPs 4, 27.
Discount Rate	The discount rate is equal to the expected rate of return on investments. This rate is currently based on the 40-quarters (10-year) historical average return (investments are in government bonds; therefore, this discount rate is government yields). Consideration should be given to the timing of the liabilities relative to the interest rates on investments of matching maturities per written FASAB guidance (see SFFAS 5 paragraph 66 and SFFAS 33 paragraph 28). Regulation: 5 USC 83-84 and SFFAS 33. Professional: ASOPs 4, 27.	The discount rate is currently equal to the expected rate of return on investments (NOT financial economic theory risk-free rates). All assumptions are reviewed with the Board of Actuaries as they apply to a plan governed by the Board of Actuaries; other plans may consider comments made by the Board of Actuaries. Regulation: 5 USC 83-84. Professional: ASOPs 4, 27.
Investment Return	See discount rate.	See discount rate.
Salary Scale	Liability and normal cost measurement include the effect of expected salary increases using ACTUARIALLY REASONABLE assumptions. Regulation: 5 USC 83-84 and SFFAS 33. Professional: ASOPs 4, 27.	Liability and normal cost measurement include the effect of expected salary increases using ACTUARIALLY REASONABLE assumptions. Regulation: 5 USC 83-84. Professional: ASOPs 4, 27.
Cost-of-Living Adjustment	ACTUARIALLY REASONABLE, reflecting plan provisions and expected behavior. Practice note: CSRS COLA is equal to CPI; FERS COLA is less than CPI (according to schedule).	ACTUARIALLY REASONABLE, reflecting plan provisions and expected behavior. Practice note: CSRS COLA is equal to CPI; FERS COLA is less than CPI (according to schedule).

	Regulation: 5 USC 83-84 and SFFAS 33. Professional: ASOPs 4, 35.	Regulation: 5 USC 83-84. Professional: ASOPs 4, 35.

Detailed Matrices

Table 20—U.S. Federal Government Pension Plans—Continued

	Accounting	SOLVENCY/Funding
Mortality	**ACTUARIALLY REASONABLE** Regulation: 5 USC 83-84 and SFFAS 33. Professional: ASOPs 4, 35.	**ACTUARIALLY REASONABLE** Regulation: 5 USC 83-84. Professional: ASOPs 4, 35.
Retirement	**ACTUARIALLY REASONABLE** Regulation: 5 USC 83-84 and SFFAS 33. Professional: ASOPs 4, 35.	**ACTUARIALLY REASONABLE** Regulation: 5 USC 83-84. Professional: ASOPs 4, 35.
Termination	**ACTUARIALLY REASONABLE** Regulation: 5 USC 83-84 and SFFAS 33. Professional: ASOPs 4, 35.	**ACTUARIALLY REASONABLE** Regulation: 5 USC 83-84. Professional: ASOPs 4, 35.
Disability	**ACTUARIALLY REASONABLE** Regulation: 5 USC 83-84 and SFFAS 33. Professional: ASOPs 4, 35.	**ACTUARIALLY REASONABLE** Regulation: 5 USC 83-84. Professional: ASOPs 4, 35.
Form of Payment	Must be **ACTUARIALLY REASONABLE**, reflecting plan provisions and expected behavior. Only applicability is regarding plan refunds of contributions with interest at retirement. Regulation: 5 USC 83-84. Professional: ASOPs 4, 35.	Must be **ACTUARIALLY REASONABLE**, reflecting plan provisions and expected behavior. Only applicability is regarding plan refunds of contributions with interest at retirement. Regulation: 5 USC 83-84. Professional: ASOPs 4, 35.
Service Recognition	According to cost method.	According to cost method.
Salary Effects on Service	According to cost method.	According to cost method.

Web Links:

ASOP 4 link:
http://www.actuarialstandardsboard.org/pdf/asops/asop004_107.pdf
ASOP 4 update:
http://www.actuarialstandardsboard.org/pdf/asops/asop004_173.pdf
ASOP 27 link:
http://www.actuarialstandardsboard.org/pdf/asops/asop027_109.pdf
ASOP 27 update:
http://www.actuarialstandardsboard.org/pdf/asops/asop027_172.pdf
ASOP 35:
http://www.actuarialstandardsboard.org/pdf/asops/asop035_118.pdf
ASOP 44:
http://www.actuarialstandardsboard.org/pdf/asops/asop044_116.pdf
5 USC 83 (including 8334 and 8347):
http://www.gpo.gov/fdsys/pkg/USCODE-2009-title5/html/USCODE-2009-title5-partIII-subpartG-chap83.htm
5 USC 84:
http://www.gpo.gov/fdsys/pkg/USCODE-2009-title5/html/USCODE-2009-title5-partIII-subpartG-chap84.htm
5 CFR 831.111:
http://edocket.access.gpo.gov/cfr_2011/janqtr/pdf/5cfr831.111.pdf
FASAB:
http://www.fasab.gov/ - navigate to "standards"

Section II

Detailed Matrices

Table 21—U.S. State and Local Government Pension Plans

	Accounting	SOLVENCY/Funding
Primary Objective	COMPARABILITY, but with recognition of COST STABILITY goals.	Generally, COST STABILITY.
Method	Entry age cost method. Regulation: GASB67/68. Professional: ASOP 4.	Specified in state and local statutes/regulations. Statute may not explicitly require a method that is actuarially sound (and in practice, some state and local pension funds are not well-funded when measured using a traditional actuarial funding method). Professional: ASOP 4.
Method—Assets	Market value of assets. Regulation: GASB67/68. Professional: ASOP 44.	Market-related value; must be in accordance with local statutes. Professional: ASOP 44.
Discount Rate	The expected rate of return on plan investments to the extent assets are expected to be sufficient to cover liabilities and 20-year, tax-exempt, HIGH-QUALITY municipal bonds rated AA/Aa or higher otherwise. Regulation: GASB 67/68. Professional: ASOPs 4, 27.	Generally specified in state or local statute; usually intended to reflect the rate of return on plan assets. Typically, the assumption cannot be changed without trustee approval (a sponsor-prescribed assumption). Regulation: State/local statutes. Professional: ASOPs 4, 27.
Investment Return	Same as discount rate. Regulation: GASB 67/68. Professional: ASOPs 4, 27.	Generally specified in state or local statute; usually intended to reflect the expected rate of return on plan assets. Typically the assumption cannot be changed without trustee approval (a prescribed assumption). Regulation: State/local statutes. Professional: ASOPs 4, 27.
Salary Scale	Liability and normal cost measurement should include the effect of expected salary increases. Regulation: GASB 67/68. Professional: ASOPs 4, 27.	Generally specified in state or local statute (often a prescribed assumption). Regulation: State/local statutes. Professional: ASOPs 4, 27.

Detailed Matrices

Table 21—U.S. State and Local Government Pension Plans—Continued

	Accounting	SOLVENCY/Funding
Cost-of-Living Adjustment	Must be included in liability measurement to the extent written in plan provisions, or established by historical practice. COLA plan provisions are common in state and local plans and are the subject of significant publicity and debate. Regulation: GASB 67/68. Professional: ASOPs 4, 27.	State and local statutes define COLA. Must be included in liability measurement to the extent written in plan provisions, or established by historical practice. COLA plan provisions are common in state and local plans and are the subject of significant publicity and debate. Some COLAs (gain-sharing provisions) are not prefunded. Regulation: State and local statute. Professional: ASOPs 4, 27.
Mortality	Must be ACTUARIALLY REASONABLE, reflecting plan provisions and expected behavior. Regulation: GASB 67/68. Professional: ASOPs 4, 35.	Subject to state and local statutes; changes are often subject to trustee approval (or often a regulatory right to "veto" changes). Regulation: State/local statutes. Professional: ASOPs 4, 35.
Retirement	Subject to state and local statutes; changes are often subject to trustee approval (or often a regulatory right to "veto" changes). Regulation: State/local statutes. Professional: ASOPs 4, 35.	Subject to state and local statutes; changes are often subject to trustee approval (or often a regulatory right to "veto" changes). Regulation: State/local statutes. Professional: ASOPs 4, 35.
Termination	Must be ACTUARIALLY REASONABLE, reflecting plan provisions and expected behavior. Regulation: GASB 67/68. Professional: ASOPs 4, 35.	Subject to state and local statutes; changes are often subject to trustee approval (or often a regulatory right to "veto" changes). Regulation: State/local statutes. Professional: ASOPs 4, 35.
Disability	Must be ACTUARIALLY REASONABLE, reflecting plan provisions and expected behavior. Regulation: GASB 67/68. Professional: ASOPs 4, 35.	Subject to state and local statutes; changes are often subject to trustee approval (or often a regulatory right to "veto" changes). Regulation: State/local statutes. Professional: ASOPs 4, 35.
Form of Payment	Must be ACTUARIALLY REASONABLE, reflecting plan provisions and expected behavior. Regulation: GASB 67/68. Professional: ASOPs 4, 35.	Subject to state and local statutes; changes are often subject to regulatory approval (or often a regulatory right to "veto" changes). Regulation: State/local statutes. Professional: ASOPs 4, 35.
Service Recognition	According to cost method.	According to cost method.
Salary Effects on Service	According to cost method.	According to cost method.

* GASB 67 is applicable for fiscal years beginning after June 15, 2013. GASB 68 is applicable for fiscal years beginning after June 15, 2014. For prior valuations refer to GASB 25/27.

Web Links:

See Table 1—Private U.S. Single-Employer Pension Plans for Web addresses/url for ASOP address.

GASB

http://www.gasb.org/—navigate to “Standards and Guidance,” then Pronouncement, and scroll down to view Standards.

Section II

Detailed Matrices

Table 22—U.S. Social Security

	Accounting	SOLVENCY/Funding
Primary Objective	Long-term SOLVENCY and TRANSPARENCY.	Sustainable SOLVENCY.
Accrual	Pay-as-you-go/cash flow projection—The goal is to measure the expected ratio of trust fund assets to expenditures in any given year, and also to measure availability of trust fund assets to meet cash flow needs not covered by current taxation. Regulation: Social Security Administration (SSA). Professional: ASOP 32.	Funding and benefit levels are determined by legislation. Method is pay-as-you-go. Actuarial valuation does not direct funding other than to provide guidance to legislators. Ultimately some measurements by the actuary might directly affect benefit and/or tax levels and therefore directly affect current level of SOLVENCY, but ultimately regulation or legislation must change funding levels. Regulation: SSA Professional: ASOP 32.
Method	Annual actuarial valuation is conducted to account for the actuarial status of Old Age and Survivors Insurance (OASI) and Disability Insurance (DI). This valuation is a key part of the Trustees Report for purposes of TRANSPARENCY—to inform taxpayers and retirees of plan operations. Regulation: SSA. Professional: ASOP 32.	Annual actuarial valuation is conducted to account for the actuarial status of OASI and DI trust fund (as well as hospital insurance (HI) fund—not handled in this matrix). This valuation will be used to consider/recommend changes to the FICA tax rate and/or benefit changes. Regulation: SSA. Professional: Rates are legislated, not directly actuarial (though the valuation influences legislated rates—ASOP 32).
Method—Open/Closed	Open group—Short term = 10-year horizon, long term = 75-year horizon. Consideration of the "infinite" horizon, to measure SUSTAINABLE SOLVENCY, is also measured and reported.	Open group—Short term = 10-year horizon, long term = 75-year horizon.
Method—Assets	All Social Security trust fund assets are government obligations—asset accounting method is different in open pay-as-you-go valuation—projection of investment gains and associated drawdown of trust fund assets to provide benefits are part of annual cash flow projections. Regulation: SSA. Professional: ASOP 32.	All Social Security trust fund assets are government obligations—asset accounting method is different in open pay-as-you-go valuation—projection of investment gains and associated drawdown of trust fund assets to provide benefits are part of cash flow projections. Regulation: SSA. Professional: ASOP 32.
Discount Rate	Investment earnings used to provide a portion of expected benefit payments are relevant in the SSA open group valuation. The discount rate should be ACTUARIALLY REASONABLE based on the invested assets. This assumption is critical in determining present value measurements. Additionally, expectations regarding the investment returns available to provide annual cash flows are a factor in determining plan solvency; however, demographic assumptions remain the most critical assumptions in determining the projected annual expected cash flows of the system.	Investment earnings used to provide a portion of expected benefit payments are relevant in the SSA open group valuation. The discount rate should be ACTUARIALLY REASONABLE based on the invested assets. This assumption is critical in determining present value measurements. Additionally, expectations regarding the investment returns available to provide annual cash flows are a factor in determining plan solvency; however, demographic assumptions remain the most critical assumptions in determining the projected annual expected cash flows of the system.

	Regulation: SSA. Professional: Not applicable.	Regulation: SSA. Professional: Not applicable.

Detailed Matrices

Table 22—U.S. Social Security—Continued

	Accounting	SOLVENCY/Funding
Investment Return	Real rate of return is assumed for the intermediate (best-estimate) assumption to reflect expected asset returns available for the payment of benefits. High-cost and low-cost assumptions are developed stochastically as well—these are used to report the uncertainty of future funding levels as well as expected trust fund depletion at various time horizons. Regulation: SSA. Professional: ASOPs 4, 27.	Real rate of return is assumed for the intermediate (best-estimate) assumption to reflect expected asset returns available for the payment of benefits. High-cost and low-cost assumptions are developed stochastically as well—these are used to report the uncertainty of future funding levels as well as expected trust fund depletion at various time horizons. Regulation: SSA. Professional: ASOPs 4, 27.
Salary Scale	The salary increase assumption is based on the assumed annual increase in wages—the assumption that ultimately matters for this valuation is the real wage increase (the excess of wage increases over inflation). Short-term wage increases cause increases in contributions. Over the long term, increases in benefits associated with wage increases hurt the measured SOLVENCY of the plan. Components of wage projection are inflation, productivity increases, hours worked—these components are used to develop an overall covered wage assumption. Assumption should be best-estimate for long-term assumptions. A high-cost and low-cost assumption are also generated stochastically. Regulation: SSA. Professional: ASOP 32.	The salary increase assumption is based on the assumed annual increase in wages—the assumption that ultimately matters for this valuation is the real wage increase (the excess of wage increases over inflation). Short-term wage increases cause increases in contributions. Over the long term, increases in benefits associated with wage increases hurt the measured SOLVENCY of the plan. Components of wage projection are inflation, productivity increases, hours worked—these components are used to develop an overall covered wage assumption. Assumption should be best-estimate for long-term assumptions. A high-cost and low-cost assumption are also generated stochastically. Regulation: SSA. Professional: ASOP 32.
Cost-of-Living Adjustment	Future benefit indexing assumed using best-estimate, long-term assumptions. A high-cost and low-cost assumption is also provided in all cases to review sensitivity—a stochastic process is used to develop these assumptions. Regulation: SSA. Professional: ASOP 32.	SSA benefits are indexed annually for benefits payable in December. Increases are based on CPI-W changes. Future benefit indexing assumed using best-estimate, long-term assumptions with additional stochastic modeling for low cost and high cost. Regulation: SSA. Professional: ASOP 32.
Mortality	Best-estimate assumption over the long term is developed to consider the effect of mortality on the working-age population and total taxable pensionable earnings. A high-cost and low-cost assumption is also provided in all cases to review sensitivity—a stochastic process is used to develop these assumptions. Regulation: SSA. Professional: ASOP 32.	Best-estimate assumption over the long term is developed to consider the effect of mortality on the working-age population and total taxable pensionable earnings. A high-cost and low-cost assumption is also provided in all cases to review sensitivity—a stochastic process is used to develop these assumptions. Regulation: SSA. Professional: ASOP 32.

Detailed Matrices

Table 22—U.S. Social Security—Continued

	Accounting	SOLVENCY/Funding
Retirement	ACTUARIALLY REASONABLE, reflecting plan provisions and expected behavior. High-cost and low-cost stochastic modeling is also provided. Regulation: SSA. Professional: ASOP 32.	ACTUARIALLY REASONABLE, reflecting plan provisions and expected behavior. High-cost and low-cost stochastic modeling is also provided. Regulation: SSA. Professional: ASOP 32.
Termination	Individual employment assumptions are not required—SSA participation is compulsory for nearly all employees, so only projections of labor force participation (recognizing unemployment/economic conditions, disability, education, and changes in life expectancy). Consideration is given to cohort effects (participation rates for particular cohorts relative to participation rates in prior periods). Regulation: SSA. Professional: ASOP 32.	Individual employment assumptions are not required—SSA participation is compulsory for nearly all employees, so only projections of labor force participation (recognizing unemployment/economic conditions, disability, education, and changes in life expectancy). Consideration is given to cohort effects (participation rates for particular cohorts relative to participation rates in prior periods). Regulation: SSA. Professional: ASOP 32.
Disability	ACTUARIALLY REASONABLE, reflecting expected disability incidence. A high-cost and low-cost assumption is also provided to review sensitivity—a stochastic process is used to develop the high- and low-cost assumptions. Regulation: SSA. Professional: ASOP 32.	ACTUARIALLY REASONABLE, reflecting expected disability incidence. A high-cost and low-cost assumption is also provided to review sensitivity—a stochastic process is used to develop the high- and low-cost assumptions. Regulation: SSA. Professional: ASOP 32.
Fertility	Assumptions to project the working-age population as well as total taxable pensionable earnings must be developed. Best-estimate assumptions over the long term are called for—statutorily the valuation looks at select period fertility trending toward ultimate fertility rates in the future (2011 report showed ultimate fertility rate reached in 2035). The dependency ratio (pensioners to contributors) is the single most critical factor in determining plan SOLVENCY. Fertility is the most critical factor in projecting the dependency ratio. A high-cost and low-cost assumption is also provided in all cases to review sensitivity—a stochastic process is used for these purposes. Regulation: SSA. Professional: ASOP 32.	Assumptions to project the working-age population as well as total taxable pensionable earnings must be developed. Best-estimate assumptions over the long term are called for—statutorily the valuation looks at select period fertility trending toward ultimate fertility rates in the future (2011 report showed ultimate fertility rate reached in 2035). The dependency ratio (pensioners to contributors) is the single most critical factor in determining plan SOLVENCY. Fertility is the most critical factor in projecting the dependency ratio. A high-cost and low-cost assumption is also provided in all cases to review sensitivity—a stochastic process is used for these purposes. Regulation: SSA. Professional: ASOP 32.

Detailed Matrices

Table 22—U.S. Social Security—Continued

	Accounting	SOLVENCY/Funding
Migration	Assumptions to project the working-age population as well as total taxable pensionable earnings must be developed. Best-estimate assumptions are used over the long term. The dependency ratio (pensioners to contributors) is the single most critical factor in determining plan SOLVENCY. Legal and illegal immigration are considered in this projection. A high-cost and low-cost assumption is also provided in all cases to review sensitivity—a stochastic process is used to develop these assumptions. Regulation: SSA. Professional: ASOP 32.	Assumptions to project the working-age population as well as total taxable pensionable earnings must be developed. Best-estimate assumptions are used over the long term. The dependency ratio (pensioners to contributors) is the single most critical factor in determining plan SOLVENCY. Legal and illegal immigration are considered in this projection. A high-cost and low-cost assumption is also provided in all cases to review sensitivity—a stochastic process is used to develop these assumptions. Regulation: SSA. Professional: ASOP 32.

Web Links:

ASOP 4 link:
http://www.actuarialstandardsboard.org/pdf/asops/asop004_107.pdf
ASOP 4 update:
http://www.actuarialstandardsboard.org/pdf/asops/asop004_173.pdf
ASOP 27 link:
http://www.actuarialstandardsboard.org/pdf/asops/asop027_109.pdf
ASOP 27 update:
http://www.actuarialstandardsboard.org/pdf/asops/asop027_172.pdf
ASOP 32:
http://www.actuarialstandardsboard.org/pdf/asops/asop032_149.pdf
Social Security law:
http://www.ssa.gov/OP_Home/ssact/comp-ssa.htm
Social Security actuarial studies:
http://www.ssa.gov/OACT/NOTES/actstud.html
Social Security Administration regulations:
http://www.ssa.gov/OP_Home/cfr20/cfrdoc.htm
IAA guidelines for Financial Analysis of Social Security Programs:
http://www.actuaries.org/CTTEES_ASC/ISAPs/pdf/isap2.pdf

Section II

Detailed Matrices

Table 23—Private Canadian Single-Employer Pension Plans

	Accounting[1]	SOLVENCY/Funding
Primary Objective	**COMPARABILITY.**	**SOLVENCY.**
Method	Public companies—Projected unit credit. Private companies—allowed to use going-concern funding valuation results for financial reporting purposes (if this option is selected other measurements must be immediate recognition—market value of assets). Otherwise use projected unit credit. Regulatory guidance: IAS 19. *CICA Handbook* Part II, Section 3462/3463. Professional: Canadian ASB 3400.	**SOLVENCY** must be measured based on unit credit—considering the present value of benefits payable in event of a termination. Annual funding requirements must also perform a valuation under a going-concern model using a reasonable actuarial method: aggregate, attained age, entry age, or individual level premium, accrued benefit, unit credit and projected unit credit. Regulation: Pension Benefits Standards Act (PBSA). Professional: Canadian ASB 3210.15.
Method—Assets	Market value of assets. Regulatory guidance: IAS 19. CICA 3462/3463. Professional: 3230.01.	**SOLVENCY**—market/fair value of assets; with adjustment for expected wind-up expenses and/or other termination-related adjustments. Going concern—Actuarial smoothing is permitted over five years. Regulation: PBSA. Professional: 3230.01.
Discount Rate	The yield on **HIGH-QUALITY** corporate Canadian fixed income securities with duration that matches the duration of the pension plan. The Canadian Institute of Actuaries (CIA) has released a new educational note that addresses setting assumptions—we recommend that users consult this new guidance. The inflation component of the cost-of-living assumption must be based on current market conditions. Regulatory Guidance: IAS 19. CICA 3462/3463. Professional: ASB 3400.	For **SOLVENCY** measurements, use of prescribed discount rates based on government bond yields and/or annuity purchase rates as applicable. For going-concern measurement use the expected rate of return on plan assets, but CANNOT consider potential "excess" gains earned from active management. Use of provisions for adverse deviation may be appropriate and should be considered when setting the assumption. Sensitivity analysis, showing the liability under a 1 percent change in the discount rate, should be included in all going-concern and solvency valuations. Alternatively can use yield based on fixed income securities. . Must consider the form of benefit payment in setting this assumption. Regulatory guidance: Pension Benefits Act. Professional: 3230.02-3230.04.
Investment Return	No longer applicable—The interest cost component of pension expense is the pension shortfall or surplus multiplied by the discount rate (market rates on **HIGH-QUALITY** corporate bonds as noted above). Regulatory Guidance: IAS 19. Professional: ASB 3400.	See discount rate. Regulation: Pension Benefits Act, 1985. Professional: 3230.02-3230.04.

Detailed Matrices

Table 23—Private Canadian Single-Employer Pension Plans—Continued

	Accounting	SOLVENCY/Funding
Salary Scale	Liability and normal cost measurement should include the effect of expected salary increases. The inflation component of the cost-of-living assumption must be based on current market conditions. Regulation: IAS 19. CICA 3462/3463. Professional: ASB 3400/3300.	SOLVENCY valuations are based on benefits earned as of the valuation date only. Going concern—Future salary assumption, if used, must be disclosed. No longer required to be considered in determining plan funding, but to the extent future salaries will affect benefits earned, consideration of this benefit should be explicit and valuation assumption disclosed. Regulation: PBSA. Professional: 3330.17-3330.21.
Cost-of-Living Adjustment	Must be ACTUARIALLY REASONABLE, reflecting plan provisions and expected behavior. Explicit recognition of COLAs, written or substantive, must be included in liability. The inflation component of the cost-of-living assumption must be based on current market conditions. Regulation: IAS 19. CICA 3462/3463. Professional: ASB 3400/3540.	SOLVENCY valuations are based on benefits earned as of the valuation date only. Going concern—Future benefit indexing, if provided, should be disclosed, but consideration of the effects must be limited to comply with the Income Tax Act limits. Practice note: Future benefit indexing is generally not considered in going-concern valuations. Regulation: PBSA, Income Tax Act. Professional: 3540 (commuted value calculations).
Mortality	Must be ACTUARIALLY REASONABLE, reflecting plan provisions and expected behavior. Practice note: New Canadian mortality rates and improvement scales have been released by the CIA in 2014. Regulation: IAS 19. CICA 3462/3463. Professional: ASB 3400.	UP94 with Scale AA applied to the appropriate date. Use of gender-specific versus blended should be based on the expected use and applicability of the calculation (include what mandates might apply). Please note that the CPM table and corresponding improvement scale have been published, and it is generally accepted that they will replace UP94 at some point. Professional: 3530.
Retirement	Must be ACTUARIALLY REASONABLE, reflecting plan provisions and expected behavior. Explicit recognition of early retirement subsidies, written or substantive, must be included in liability. Regulation: IAS 19. CICA 3462/3463. Professional: ASB 3400/3230.	Must be ACTUARIALLY REASONABLE, reflecting plan provisions and expected behavior, including substantive operation by the plan sponsor to waive early retirement reductions or provide other retirement-related enhancements. Consider provisions for adverse deviation. Regulation: PBSA. Professional: 3230.05-3230.06.
Termination	Must be ACTUARIALLY REASONABLE, reflecting plan provisions and expected behavior; depending on plan circumstances explicit assumption may not be required. Regulation: IAS 19. CICA 3462/3463. Professional: ASB 3400/3230.	Must be ACTUARIALLY REASONABLE, reflecting plan provisions and expected behavior. Should consider the possible inclusion of provisions for adverse deviation. Regulation: PBSA. Professional: 3230.

Section II

Detailed Matrices

Table 23—Private Canadian Single-Employer Pension Plans—Continued

	Accounting	SOLVENCY/Funding
Disability	Must be **ACTUARIALLY REASONABLE**, reflecting plan provisions and expected behavior; depending on plan circumstances explicit assumption may not be required. Regulation: IAS 19. CICA 3462/3463. Professional: ASB 3400/3230.	Must be **ACTUARIALLY REASONABLE**, reflecting plan provisions and expected behavior. Should consider the possible inclusion of provisions for adverse deviation. Regulation: PBSA. Professional: 3230.
Form of Payment	Must be **ACTUARIALLY REASONABLE**, reflecting plan provisions and expected behavior. Regulation: IAS 19. CICA 3462/3463. Professional: ASB 3400/3320/3500.	Must be **ACTUARIALLY REASONABLE**, reflecting plan provisions and expected behavior. Should consider the possible inclusion of provisions for adverse deviation. Regulation: PBSA. Professional: 3320.
Service Recognition	Liability includes past service; normal cost is service for the year.	**SOLVENCY** valuation must include all expected benefits through the estimated termination/wind-up date.
Salary Effects on Service	All future salary effects recognized immediately with the service. For plan level accounting—not applicable.	Must be considered to the extent they will affect the benefits payable.

[1] Unless specifically stated otherwise, plan level accounting follows *CICA Handbook* Section 4600 (Part IV). In general, liabilities for plan level accounting are calculated under the unit credit method as the present value of accrued retirement benefits using **ACTUARIALLY REASONABLE** assumptions. Also, special rules and regulations affecting plans at the federal (for example, Air Canada Pension Plan and Canadian Press Pension Plan) and provincial level are not included in this summary—for more details regarding these provisions, information can be found on Canada Department of Justice website. Careful consideration of plan-specific exceptions should be reviewed by practitioners.

Additional note: Regulatory guidance includes numerous regulations at the provincial level. This matrix attempts to summarize the predominant provisions applicable to Canadian RPPs, but additional restrictions or guidance may apply in certain jurisdictions/provinces.

Web Links:

ASB 3000-3500:
http://www.cia-ica.ca/docs/default-source/standards/sp020114e.pdf?sfvrsn=0

Pension Benefit Standards Act:
http://laws-lois.justice.gc.ca/eng/acts/P-7.01/

Pension Benefit Standards Act regulations:
http://laws-lois.justice.gc.ca/PDF/SOR-87-19.pdf

Canada Income Tax Act:
http://laws-lois.justice.gc.ca/eng/acts/i-3.3/index.html

IAS 19:
http://eifrs.iasb.org/eifrs/bnstandards/en/ias19.pdf—must be a registered user—registration is free

CICA Handbook Part II, Section 3462:
http://www.frascanada.ca/standards-for-private-enterprises/resources/basis-for-conclusions/item76708.pdf

Copies of CICA standards can be found at: http://www.frascanada.ca/index.aspx.

Discount rate selection practice notes:
http://www.actuaries.ca/members/publications/2011/211088e.pdf

Canadian Pensioners' Mortality:
http://www.cia-ica.ca/docs/default-source/2014/214013e.pdf

Section II

Detailed Matrices

Table 24—Private Canadian MULTIEMPLOYER Pension Plans

	Accounting	SOLVENCY/Funding
Primary Objective	"Fairness"—cash flow.	SOLVENCY.
Method	MULTIEMPLOYER costs are reported by contributing employers based on contribution requirements—current as well as required WITHDRAWAL LIABILITY payments. To the extent defined-benefit-type information is available to a participating employer, disclosures should be made on the basis of defined-benefit accounting for single-employer plans. Practice note: IFRS guidance encourages the consideration of defined-benefit-type information as much as possible. Regulation: IAS 19. Professional: Not applicable.	SOLVENCY must be measured based on unit credit—considering the present value of benefits payable in event of a termination—consideration can be given to the possibility that benefits will be reduced on termination, in accordance with plan provisions and provincial law as applicable. Must perform a valuation under a going-concern model using a reasonable actuarial method: aggregate, attained age, entry age, or individual level premium, accrued benefit, unit credit and projected unit credit. Contributions can be set by contract as long as expected contributions and assets are actuarially sufficient to cover expected benefits. Regulation: PBSA, 1985 section 7; SOLVENCY Funding Relief Act. Professional: Canadian ASB 3210.15.
Method—Assets	MULTIEMPLOYER costs are reported by contributing employers based on contribution requirements—current as well as required WITHDRAWAL LIABILITY payments. Regulation: IAS 19. Professional: Not applicable.	SOLVENCY—market/fair value of assets; with adjustment for expected wind-up expenses and/or other termination-related adjustments. Going concern—Actuarial smoothing is permitted. Regulation: PBSA. Professional: 3230.01.
Discount Rate	No assumption. MULTIEMPLOYER costs are reported by contributing employers based on contribution requirements—current as well as required WITHDRAWAL LIABILITY payments. Regulation: IAS 19. Professional: Not applicable.	For SOLVENCY measurements, use of prescribed discount rates based on government bond yields and/or annuity purchase rates as applicable. For going-concern measurement use the expected rate of return on plan assets, but CANNOT consider potential "excess" gains earned from active management. Use of provisions for adverse deviation may be appropriate and should be considered when setting the assumption. Sensitivity analysis, showing the liability under a 1 percent change in the discount rate, should be included in all current valuations. Regulation: Pension Benefits Act, 1985. Professional: 3230.02-3230.04.

Detailed Matrices

Table 24—Private Canadian MULTIEMPLOYER Pension Plans—Continued

	Accounting	SOLVENCY/Funding
Investment Return	No assumption. MULTIEMPLOYER costs are reported by contributing employers based on contribution requirements—current as well as required WITHDRAWAL LIABILITY payments. Regulation: IAS 19. Professional: Not applicable.	For SOLVENCY measurements, use of prescribed discount rates based on government bond yields and/or annuity purchase rates as applicable. For going-concern measurement use the expected rate of return on plan assets, but CANNOT consider potential "excess" gains earned from active management. Use of provisions for adverse deviation may be appropriate and should be considered when setting the assumption. Sensitivity analysis, showing the liability under a 1 percent change in the discount rate, should be included in all current valuations. Regulation: Pension Benefits Act, 1985. Professional: 3230.02-3230.04.
Salary Scale	No assumption. MULTIEMPLOYER costs are reported by contributing employers based on contribution requirements—current as well as required WITHDRAWAL LIABILITY payments. Regulation: IAS 19. Professional: Not applicable.	SOLVENCY—To the extent benefits would be payable according to any future salary adjustment an ACTUARIALLY REASONABLE salary increase assumption should be used. Going concern—Future salary assumption, if used, must be disclosed. No longer required to be considered in determining plan funding, but to the extent future salaries will affect benefits earned, consideration of this benefit should be explicit and valuation assumption disclosed. Regulation: PBSA. Professional: 3330.17-3330.21.
Cost-of-Living Adjustment	No assumption. MULTIEMPLOYER costs are reported by contributing employers based on contribution requirements—current as well as required WITHDRAWAL LIABILITY payments. Regulation: IAS 19. Professional: Not applicable.	SOLVENCY—To the extent benefits would be payable according to any future benefit adjustment, an ACTUARIALLY REASONABLE COLA assumption should be used. Going concern—Future benefit indexing, if provided, should be disclosed, but Income Tax Act limits must be considered. Regulation: PBSA, Income Tax Act. Professional: 3540 (commuted value calculations).
Mortality	No assumption. MULTIEMPLOYER costs are reported by contributing employers based on contribution requirements—current as well as required WITHDRAWAL LIABILITY payments. Regulation: IAS 19. Professional: Not applicable.	UP94 with Scale AA applied to the appropriate date. Use of gender-specific versus blended should be based on the expected use and applicability of the calculation (include what mandates might apply). See additional comments under Private Canadian Single-Employer Pension Plans matrix. Professional: 3530.

Detailed Matrices

Table 24—Private Canadian MULTIEMPLOYER Pension Plans—Continued

	Accounting	SOLVENCY/Funding
Retirement	No assumption. MULTIEMPLOYER costs are reported by contributing employers based on contribution requirements—current as well as required WITHDRAWAL LIABILITY payments. Regulation: IAS 19. Professional: Not applicable.	ACTUARIALLY REASONABLE, reflecting plan provisions and expected behavior, including substantive operation by the plan sponsor to waive early retirement reductions or provide other retirement-related enhancements. Expected reductions in plan benefits upon wind-up can be considered to the extent provided by plan provisions and allowed by provincial law. Use of provisions for adverse deviation may be appropriate and should be considered when setting the assumption. Regulation: PBSA. Professional: 3230.05-3230.06.
Termination	No assumption. MULTIEMPLOYER costs are reported by contributing employers based on contribution requirements—current as well as required WITHDRAWAL LIABILITY payments. Regulation: IAS 19. Professional: Not applicable.	Must be ACTUARIALLY REASONABLE, reflecting plan provisions and expected behavior. Use of provisions for adverse deviation may be appropriate and should be considered when setting the assumption. Regulation: PBSA. Professional: 3230.
Disability	No assumption. MULTIEMPLOYER costs are reported by contributing employers based on contribution requirements—current as well as required WITHDRAWAL LIABILITY payments. Regulation: IAS 19. Professional: Not applicable.	Must be ACTUARIALLY REASONABLE, reflecting plan provisions and expected behavior. Use of provisions for adverse deviation may be appropriate and should be considered when setting the assumption. Regulation: PBSA. Professional: 3230.
Form of Payment	No assumption. MULTIEMPLOYER costs are reported by contributing employers based on contribution requirements—current as well as required WITHDRAWAL LIABILITY payments. Regulation: IAS 19. Professional: Not applicable.	Must be ACTUARIALLY REASONABLE, reflecting plan provisions and expected behavior. Use of provisions for adverse deviation may be appropriate and should be considered when setting the assumption. Regulation: PBSA. Professional: 3320.
Service Recognition	Not applicable.	SOLVENCY valuation must include all expected benefits through the estimated termination/wind-up date.
Salary Effects on Service	Not applicable.	Must be considered to the extent they will affect the benefits already earned.

See Table 6—Private Canadian Single-Employer Pension Plans. See Canadian Single-Employer for Web links.

Section II

Detailed Matrices

Table 25—Canadian Federal Government Pension Plans

	Accounting	SOLVENCY/Funding
Primary Objective	**TRANSPARENCY.**	**SOLVENCY.**
Method	Measurement of liabilities uses projected unit credit (also referred to as projected accrued benefit). Method is consistent with funding valuations, but is updated annually for accounting reporting purposes. Regulation: Canadian GAAP—CICA 4600. Professional: ASB 3210.	No SOLVENCY valuation is completed (as no wind-up of the plan is expected). Measurement of liabilities uses projected unit credit (also referred to as projected accrued benefit). Valuations completed every three years. Regulation: Public Service Superannuation Act (PSSA). Professional: ASB 3210.
Method—Assets	Superannuation account (for service earned prior to 2000) value is assumed equal to the book value of notional bonds. Generally assets must be reported as fair value/market value without actuarial smoothing. Regulation: CICA 4600. Professional: ASB 3230.	Superannuation account value is assumed equal to the book value of notional bonds. Fund assets are measured using an actuarial smoothing value of five years. Regulation: PSSA. Professional: ASB 3230.
Discount Rate	Discounting of future funding contributions is based on the assumed yield of the pension fund. The PSPIB sets the expected rate of return on all types of assets. Assumption should be best-estimate, long-term assumptions on a going-concern basis. For the superannuation account, the rate is based on the hypothetical yields of the notional bond portfolio. Regulation: PSSA and CICA 4600. Professional: ASB 3230, 3400.	Discounting of future funding contributions is based on the assumed yield of the pension fund. The PSPIB sets the expected rate of return on all types of assets. Assumption should be best-estimate, long-term assumptions on a going-concern basis. For the superannuation account, the rate is based on the hypothetical yields of the notional bond portfolio. Regulation: PSSA. Professional: ASB 3230, 3400.
Investment Return	Discounting of future funding contributions is based on the assumed yield of the pension fund. The PSPIB sets the expected rate of return on all types of assets. Assumption should be based on a best-estimate of the long-term investment return assumptions on a going-concern basis. Regulation: PSSA and CICA 4600. Professional: ASB 3230, 3400.	Discounting of future funding contributions is based on the assumed yield of the Pension Fund. The PSPIB sets the expected rate of return on all types of assets. Assumption should be based on a best-estimate of the long-term investment return assumptions on a going-concern basis. Regulation: PSSA. Professional: ASB 3230, 3400.
Salary Scale	Future salary assumption is based on the assumed annual increase in pensionable earnings—explicitly include provision for seniority and merit-based increases. Assumption should be best-estimate long-term assumptions on a going-concern basis. Regulation: CICA 4600. Professional: 3330.17-3330.21.	Future salary assumption is based on the assumed annual increase in pensionable earnings—explicitly include provision for seniority and merit-based increases. Assumption should be best-estimate, long-term assumptions on a going-concern basis. Regulation: CICA 4600. Professional: 3330.17-3330.21.

Detailed Matrices

Table 25—Canadian Federal Government Pension Plans—Continued

	Accounting	SOLVENCY/Funding
Cost-of-Living Adjustment	Future benefit indexing assumed using best-estimate, long-term assumptions. Regulation: CICA 4600. Professional: 3540 (commuted value calculations).	Future benefit indexing assumed using best-estimate, long-term assumptions. Regulation: PSSA, Income Tax Act. Professional: 3540 (commuted value calculations).
Mortality	Must be ACTUARIALLY REASONABLE, reflecting both projected mortality improvement as well as observed mortality experience. Regulation: PSSA and CICA 4600. Professional: ASB 3400.	Must be ACTUARIALLY REASONABLE, reflecting both projected mortality improvement as well as observed mortality experience. Regulation: PSSA. Professional: ASB 3400.
Retirement	Must be ACTUARIALLY REASONABLE, reflecting plan provisions and expected behavior, including substantive operation by the plan sponsor. Regulation: PSSA and CICA 4600. Professional: 3230.05-3230.06.	Must be ACTUARIALLY REASONABLE, reflecting plan provisions and expected behavior, including substantive operation by the plan sponsor. Regulation: PSSA. Professional: 3230.05-3230.06.
Termination	Must be ACTUARIALLY REASONABLE, reflecting plan provisions and expected behavior. Regulation: PSSA and CICA 4600. Professional: 3230.	Must be ACTUARIALLY REASONABLE, reflecting plan provisions and expected behavior. Regulation: PSSA. Professional: 3230.
Disability	Must be ACTUARIALLY REASONABLE, reflecting plan provisions and expected behavior. Regulation: PSSA and CICA 4600. Professional: 3230.	Must be ACTUARIALLY REASONABLE, reflecting plan provisions and expected behavior. Regulation: PSSA. Professional: 3230.
Form of Payment	Must be ACTUARIALLY REASONABLE, reflecting plan provisions and expected behavior. Regulation: PSSA and CICA 4600. Professional: 3320.	Must be ACTUARIALLY REASONABLE, reflecting plan provisions and expected behavior. Regulation: PSSA. Professional: 3320.
Service Recognition	Liability includes past service; normal cost is service for the year.	Liability includes past service; normal cost is service for the year.
Salary Effects on Service	All future salary effects recognized immediately with the service. For plan level accounting—not applicable.	All future salary effects recognized immediately with the service. For plan level accounting—not applicable.

Note: Certain plans that might be considered federal will be handled under the methods described in the next table (Canadian Provincial and Local Pension Plans) under PS 3250.

Web Links:

ASB 3000-3500:

http://www.actuaries.ca/SOP_Doc/3000_Pension/Part_3000_December_31_2010_E.pdf

Public Service Superannuation Act:

http://laws-lois.justice.gc.ca/eng/acts/P-36/index.html

CICA 4600:

http://www.frascanada.ca/international-financial-reporting-standards/resources/basis-for-conclusions/item40092.pdf

Copies of CICA standards can be found at: http://www.frascanada.ca/index.aspx.

Detailed Matrices

Table 26—Canadian Provincial and Local Pension Plans

	Accounting[1]	SOLVENCY/Funding[2]
Primary Objective	COMPARABILITY, but with recognition of COST STABILITY goals.	Generally, COST STABILITY.
Method	Accrued benefit funding methods (for example, projected benefit method prorated on service) are preferred. Level cost methods (entry age, frozen entry age, attained age, frozen attained age, aggregate) are also acceptable. Regulation: PS3250.022-.032. Professional: ASB 3210.	SOLVENCY must be measured based on unit credit—considering the present value of benefits payable in event of a termination. Regulation: PBSA, 1985. Local provincial law modifies and expands requirements. Professional: Canadian ASB 3210.15.
Method—Assets	Market value/fair value—Or market-related value with gain-loss smoothing over no more than five years is acceptable. Regulation: PS3250.033-.038. Professional: ASB 3230.01.	SOLVENCY—market/fair value of assets. Regulation: PBSA and Provincial Pension Benefits Acts. Professional: ASB 3230.01.
Discount Rate	The discount rate is equal to the investment return rate or the borrowing rate for the government entity as applicable. Consideration must be given to the inflation component to ensure consistency with salary scale and/or COLA assumptions. Regulation: PS3250.040-.049. Professional: ASB 3230.02-.04.	For SOLVENCY measurements, use of prescribed discount rates based on government bond yields and/or annuity purchase rates as applicable. For going-concern measurement use the expected rate of return on plan assets, but CANNOT consider potential "excess" gains earned from active management. Use of provisions for adverse deviation may be appropriate and should be considered when setting the assumption. Alternatively can use yield based on fixed income securities. Regulation: Pension Benefits Act, 1985. Professional: 3230.02-3230.04.
Investment Return	The discount rate is equal to the investment return rate and/or the borrowing rate for the government entity as applicable. Regulation: PS3250.040-.049. Professional: ASB 3400.	For SOLVENCY measurements, use of prescribed discount rates based on government bond yields and/or annuity purchase rates as applicable. For going-concern measurement use the expected rate of return on plan assets, but CANNOT consider potential "excess" gains earned from active management. Use of provisions for adverse deviation may be appropriate and should be considered when setting the assumption. Alternatively can use yield based on fixed income securities. Regulation: Pension Benefits Act, 1985. Professional: 3230.02-3230.04.

Detailed Matrices

Table 26—Canadian Provincial and Local Pension Plans—Continued

	Accounting[1]	SOLVENCY/Funding[2]
Salary Scale	Liability and normal cost measurement should include the effect of expected salary increases. Consideration must be given to the inflation component to ensure consistency with discount rate and/or COLA assumptions. Regulation: PS3250.040-.049. Professional: ASB 3400/3300.	SOLVENCY—To the extent benefits would be payable according to any future salary adjustment, an ACTUARIALLY REASONABLE salary increase assumption should be used. Going concern—Future salary assumption, if used, must be disclosed. No longer required to be considered in determining plan funding, but to the extent future salaries will affect benefits earned, consideration of this benefit should be explicit and valuation assumption disclosed. Regulation: PBSA. Professional: 3330.17-3330.21.
Cost-of-Living Adjustment	Must be ACTUARIALLY REASONABLE, reflecting plan provisions and expected behavior. Explicit recognition of COLAs, written or substantive, must be included in liability. Consideration must be given to the inflation component to ensure consistency with discount rate and/or salary scale assumptions. Regulation: PS3250.040-.049. Professional: ASB 3400/3540.	SOLVENCY—To the extent benefits would be payable according to any future benefit increase adjustment, an ACTUARIALLY REASONABLE COLA assumption should be used. Going concern—Future benefit indexing, if provided, should be disclosed, but Income Tax Act limits must be considered. Regulation: PBSA, Income Tax Act. Professional: 3540 (commuted value calculations).
Mortality	Must be ACTUARIALLY REASONABLE, reflecting plan provisions and expected experience. Regulation: PS3250.040-.049. Professional: ASB 3400.	ACTUARIALLY REASONABLE. Use of gender-specific versus blended should be based on the expected use and applicability of the calculation (including mandates if they apply for lump sum/commuted settlement). Professional: 3530.
Retirement	Must be ACTUARIALLY REASONABLE, reflecting plan provisions and expected behavior. Explicit recognition of early retirement subsidies, written or substantive, must be included in liability. Regulation: PS3250.040-.049. Professional: ASB 3400/3230.	Must be ACTUARIALLY REASONABLE, reflecting plan provisions and expected behavior, including substantive operation by the plan sponsor to waive early retirement reductions or provide other retirement-related enhancements. Use of provisions for adverse deviation may be appropriate and should be considered when setting the assumption. Regulation: PBSA. Professional: 3230.05-3230.06.
Termination	Must be ACTUARIALLY REASONABLE, reflecting plan provisions and expected behavior; depending on plan circumstances explicit assumption may not be required. Regulation: PS3250.040-.049. Professional: ASB 3400/3230.	Must be ACTUARIALLY REASONABLE, reflecting plan provisions and expected behavior. Use of provisions for adverse deviation may be appropriate and should be considered when setting the assumption. Regulation: PBSA. Professional: 3230.

Detailed Matrices

Table 26—Canadian Provincial and Local Pension Plans—Continued

	Accounting[1]	SOLVENCY/Funding[2]
Disability	Must be ACTUARIALLY REASONABLE, reflecting plan provisions and expected behavior; depending on plan circumstances explicit assumption may not be required. Regulation: PS3250.040-.049. Professional: ASB 3400/3230.	Must be ACTUARIALLY REASONABLE, reflecting plan provisions and expected behavior. Use of provisions for adverse deviation may be appropriate and should be considered when setting the assumption. Regulation: PBSA. Professional: 3230.
Form of Payment	Must be ACTUARIALLY REASONABLE, reflecting plan provisions and expected behavior. Regulation: PS3250.040-.049. Professional: ASB 3400/3320/3500.	Must be ACTUARIALLY REASONABLE, reflecting plan provisions and expected behavior. Use of provisions for adverse deviation may be appropriate and should be considered when setting the assumption. Regulation: PBSA. Professional: 3320.
Service Recognition	Liability includes past service; normal cost is service for the year.	SOLVENCY valuation must include all expected benefits through the estimated termination/wind-up date.
Salary Effects on Service	Must be considered to the extent they will affect the benefits payable.	Must be considered to the extent they will affect the benefits payable.

[1] NOTE: “Shared-risk” plans, in which contributions and benefits may both be variable subject to plan design, are currently a topic of discussion for accounting purposes. Specifically, while the plans are generally seen as defined-benefit plans from the accounting perspective, different approaches to measuring the obligation under such plans are being examined. Please see the Public Sector Accounting Discussion Group report for more details: http://www.frascanada.ca/standards-for-public-sector-entities/public-sector-accounting-discussion-group/search-past-meeting-topics/item79766.pdf.

[2] Federal regulations, modified under provincial law, require filing of funding progress reports at least every three years.

Web Links:
ASB 3000-3500:
http://www.actuaries.ca/SOP_Doc/3000_Pension/Part_3000_December_31_2010_E.pdf
Public Benefits Standards Act:
http://laws-lois.justice.gc.ca/eng/acts/P-7.01/
Copies of PS3250 and CICA public section accounting standards can be ordered from CICA at
http://www.castore.ca/product/cica-public-sector-accounting-handbook/10?urlcode=psab-ps&newlang=en

Section II

Detailed Matrices

Table 27—Canada Pension Plan[1]

	Accounting	SOLVENCY/Funding
Primary Objective	Long-term SOLVENCY.	Development of steady-state contribution rate.
Accrual	STEADY-STATE FUNDING (mixed pay-as-you-go/accrual)—Goal is to stabilize the ratio of assets to expenditures over time. OAS is funded pay-as-you-go through general revenue. Regulation: CPP 113.1(4).	STEADY-STATE FUNDING (mixed pay-as-you-go/accrual)—goal is to stabilize the ratio of assets to expenditures over time. Any NEW benefit enhancements enacted in the future must be fully funded by regulation. Regulation: CPP 113.1(4).
Method	Once every three years an actuarial valuation is conducted to account for the actuarial status of CPP. This valuation will be reported to contributors and pensioners in the plan for purposes of TRANSPARENCY—to inform members of plan operations. Regulation: CPP. Professional: ASB, GAPSSP-IAA.	Once every three years an actuarial valuation is conducted to account for the actuarial status of CPP. This valuation will be used by the ministers of finance to consider/recommend changes to the contribution rate and/or benefit changes. Limitations exist as to the extent that contribution rates can be changed (no more than 0 .1 percent per annum). There will be a gradual change in the adjustments for early and late receipt of the CPP retirement pension to restore actuarial fairness. This will further increase the pension for those who start receiving it after age 65, and further reduce it for those who start receiving it before age 65 to ensure there are no unfair advantages or disadvantages to early or late receipt of CPP retirement benefits. The changes in the pension adjustments will be phased in gradually over a number of years, starting in 2011 and will be at their actuarially fair levels by 2016. Regulation: CPP. Professional: Rates are legislated, not directly actuarial (though the valuation influences legislated rates directly).
Method—Open/Closed	Open group—75-year horizon. A closed group valuation is also included in the reports for reference—this does not form the primary basis for reporting, however.	Open group—75-year horizon.
Method—Assets	Prior to 2001, not applicable as all investments were short-term or non-market loans to provinces/bonds. Excess cash flows are now market-invested—measured at market value. Regulation: CPP. Professional: ASB, GAPSSP-IAA.	Prior to 2001, not applicable as all investments were short-term or non-market loans to provinces/bonds. Excess cash flows are now market-invested—measured at market value. Regulation: CPP. Professional: ASB, GAPSSP-IAA.

Detailed Matrices

Table 27—Canada Pension Plan—Continued [1]

	Accounting	SOLVENCY/Funding
Discount Rate	Investment earnings used to provide a portion of expected benefit payments are considered in the CPP-type open group valuation. The discount rate should be ACTUARIALLY REASONABLE based on the invested assets. This assumption is critical in determining present value measurements. Additionally, expectations regarding the investment returns available to provide annual cash flows are a factor in determining plan solvency; however, demographic assumptions remain the most critical assumptions in determining the projected annual expected cash flows of the system. Regulation: CPP. Professional: Not applicable.	Investment earnings used to provide a portion of expected benefit payments are considered in the CPP-type open group valuation. The discount rate should be ACTUARIALLY REASONABLE based on the invested assets. This assumption is critical in determining present value measurements. Additionally, expectations regarding the investment returns available to provide annual cash flows are a factor in determining plan solvency; however. demographic assumptions remain the most critical assumptions in determining the projected annual expected cash flows of the system. Regulation: CPP. Professional: Not applicable.
Investment Return	Real rate of return should be best-estimate assumption to reflect expected contribution of asset returns toward payment of benefits. High-cost and low-cost assumptions are developed stochastically as well, but these do NOT affect pay-as-you- go results—only minimum required contribution projections. Regulation: CPP. Professional: ASB, GAPSSP-IAA.	Real rate of return should be best-estimate assumption to reflect expected contribution of asset returns toward payment of benefits. Regulation: CPP. Professional: ASB, GAPSSP-IAA.
Salary Scale	Future salary assumption is based on the assumed annual increase in wages—the assumption that ultimately matters is the real wage increase (the excess of wage increases over inflation). Short-term wage increases cause increases in contributions, but over the long term also cause increases in benefits; this is why the net "productivity" increase is ultimately the most important assumption. Assumption should be the best-estimate, long-term assumption. A high-cost and low-cost assumption is also provided in all cases to review sensitivity—a stochastic process is used to develop the high-cost and low-cost real wage assumptions. Regulation: CPP. Professional: 3330.17-3330.21, GAPSSP-IAA.	Future salary assumption is based on the assumed annual increase in wages—the real wage increase (the excess of wage increases over inflation). Assumption should be the best-estimate, long-term assumption. Regulation: CPP. Professional: 3330.17-3330.21, GAPSSP-IAA.
Cost-of-Living Adjustment	Future benefit indexing assumed using best-estimate, long-term assumptions. A high-cost and low-cost assumption is also provided in all cases to review sensitivity—a stochastic process is used to develop these assumptions looking at overall CPI/price increases. Regulation: CPP.	CPP benefits are revised once a year, in January. Increases are based on CPI changes over a 12-month period. Future benefit indexing assumed using best-estimate, long-term assumptions. Regulation: CPP. Professional: 3540 (commuted value calculations).

	Professional: 3540 (commuted value calculations).	

Detailed Matrices

Table 27—Canada Pension Plan—Continued [1]

	Accounting	SOLVENCY/Funding
Mortality	Assumptions for factors affecting the working-age population as well as total taxable pensionable earnings must be developed. Best-estimate assumptions over the long term are used—statutorily the valuation looks at a projected period, and 50 years beyond that point as well. Total period considered is 75 years. The dependency ratio (pensioners to contributors) is the single most critical factor in determining plan SOLVENCY. Mortality is one of the factors in projecting the dependency ratio. A high-cost and low-cost assumption is also provided in all cases to review sensitivity using a stochastic process. Regulation: CPP. Professional: ASB, GAPSSP-IAA.	Assumptions for factors affecting the working-age population as well as total taxable pensionable earnings must be developed. Best-estimate assumptions over the long term are used. Regulation: CPP. Professional: ASB/GAPSSP-IAA.
Retirement	Must be ACTUARIALLY REASONABLE, reflecting plan provisions and expected behavior, including recently enacted legislation (recognizing short-term changes in expected behavior); for example, the expected increase in early take-up during 2011 before 2012 law changes take effect. A high-cost and low-cost assumption is also provided in all cases to review sensitivity. Regulation: CPP. Professional: 3230, GAPSSP-IAA.	Must be ACTUARIALLY REASONABLE, reflecting plan provisions and expected behavior, including recently enacted legislation (recognizing short-term changes in expected behavior); for example, the expected increase in early take-up during 2011 before 2012 law changes take effect. Regulation: CPP. Professional: 3230/GAPSSP-IAA.
Termination	Not applicable—Only participation in covered employment has an effect on CPP valuation. Market participation rates/unemployment rate assumptions are developed on a best-estimate basis. A high-cost and low-cost assumption is also provided in all cases to review sensitivity—unlike most other demographic assumptions, a deterministic process is used to develop high-cost and low-cost termination projections. Regulation: CPP. Professional: ASB, GAPSSP-IAA32.	Not applicable—Only participation in covered employment has an effect on CPP valuation. Market participation rates/unemployment rate assumptions are developed on a best-estimate basis. Regulation: CPP. Professional: ASB, GAPSSP-IAA.
Disability	Must be ACTUARIALLY REASONABLE, reflecting expected incidence. A high-cost and low-cost assumption is also provided in all cases to review sensitivity—a stochastic process is used to develop these assumptions. Regulation: CPP. Professional: 3230, GAPSSP-IAA.	Must be ACTUARIALLY REASONABLE, reflecting expected incidence of disability. Regulation: CPP. Professional: 3230, GAPSSP-IAA.

Detailed Matrices

Table 27—Canada Pension Plan—Continued [1]

	Accounting	SOLVENCY/Funding
Fertility	Assumptions for factors affecting the working-age population as well as total taxable pensionable earnings must be developed. Best-estimate assumptions over the long term are used—statutorily the valuation looks at a projected period, and 50 years beyond that point as well. Total period considered is 75 years. The dependency ratio (pensioners to contributors) is the single most critical factor in determining plan SOLVENCY. Fertility is one of (if not the) most critical factor in projecting the dependency ratio. A high-cost and low-cost assumption is also provided in all cases to review sensitivity—a stochastic process is used for these purposes. Regulation: CPP. Professional: ASB, GAPSSP-IAA.	Assumptions for factors affecting the working-age population as well as total taxable pensionable earnings must be developed. Best-estimate assumptions over the long term are used. Regulation: CPP. Professional: ASB, GAPSSP-IAA.
Migration	Assumptions for factors affecting the working-age population as well as total taxable pensionable earnings must be developed. Best-estimate assumptions over the long-term are used—statutorily the valuation looks at a projected period, and 50-years beyond that point as well. Total period considered is 75 years. The dependency ratio (pensioners to contributors) is the single most critical factor in determining plan SOLVENCY. Migration is a factor in projecting the dependency ratio but is far less critical than fertility or mortality. A high cost and low cost assumption are also provided in all cases to review sensitivity—a stochastic process is used to develop these assumptions. Regulation: CPP. Professional: ASB, GAPSSP-IAA.	Assumptions for factors affecting the working-age population as well as total taxable pensionable earnings must be developed. Best-estimate assumptions over the long term are used. Regulation: CPP. Professional: ASB, GAPSSP-IAA.

[1] Provincial governments have authority to establish their own social insurance program. Quebec has done so—QPP—general guidance for QPP (or any other provincial social insurance program) is in general consistent with the provisions noted in this matrix.

Web Links:
CPP Act:
http://laws-lois.justice.gc.ca/eng/acts/C-8/index.html
CPP regulations:
http://laws-lois.justice.gc.ca/eng/regulations/C.R.C.,_c._385/index.html
ASB:
http://www.asb-cna.ca/
IAA guidelines for Financial Analysis of Social Security Programs:
http://www.actuaries.org/CTTEES_ASC/ISAPs/pdf/isap2.pdf

Section II

Detailed Matrices

Additional Notes—Exceptions to Standards, Special Cases, and Other Types of Plans

Church plans—Plans sponsored by religious entities are typically optionally exempt from most of the rules and regulations noted in these matrices. Church entities may follow these guidelines but are not required to do so.

Defined-contribution plans—in both Canada and the United States individuals and employers maintain defined-contribution retirement plans. Generally, these plans are accounted for and funded with reference to contributions and current account balances. These plans are a significant part of the retirement system. While actuaries are not required to be involved with the funding and accounting for these plans, many actuaries provide services regarding plan design and projections of the benefits available.

Non-qualified pension plans—These are plans that do not meet the requirements to be exempt from taxation in their respective jurisdictions. These plans are generally not required (or in many cases allowed) to be funded and therefore do not follow the funding rules noted in these matrices. There are some plans that are funded with trusts with specific legal requirements and status—details are outside the scope of this paper. Non-qualified pension plans are required to be accounted for according to these matrices—any reference to investments will generally not be applicable.

Retiree welfare benefits—Retiree welfare benefits are provided by many U.S. public entities, as well as other entities covered in these matrices. Generally, the accounting requirements for these plans follow the same provisions included in these matrices, substituting assumptions regarding salary increases and COLAs with medical trend (inflation) rates to the extent applicable. For post-retirement welfare benefits that are tied to salary increases (for example, life insurance), the salary increase assumption is still applicable. Most plans are not funded, and when they are funded the funding rules follow significantly different guidance than what is included in the previous pages and is outside the scope of this report.

U.S. federal government Contractors—Generally pension plan sponsors that provide services to the federal government are required to follow cost accounting standards (CAS). We have not included details regarding cost accounting standards in this report. Based on discussions with actuaries employed by the U.S. government, current practice is generally to have CAS follow U.S. pension funding requirements under the Pension Protection Act of 2006 (**PPA**). Links for more discussion regarding cost accounting and guidelines for the government covering costs of contractors can be found at http://www.whitehouse.gov/omb/procurement_casb/ and http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?c=ecfr&sid=03f0d1e7be184532e1ecc92fdb0239a9&rgn=div5&view=text&node=48:1.0.1.5.30&idno=48 respectively.

Section III

Glossary

Links regarding specific regulation are generally not included within this glossary. Please refer to the detailed matrices on pages 23 to 61 for specific guidelines that are not found in this glossary.

Accountability—The responsibility for one party to explain themselves to another party. As used in this matrix, it is the responsibility for an entity to provide information that allows the recipient of that information to understand the commitments made and the means by which those commitments are intended to be satisfied.

Actuarially reasonable/actuarial reasonable assumptions—Assumptions that represent the best long-term estimate of expected occurrences for a given assumption. An assumption may be considered actuarially reasonable under various criteria (for further guidance about what constitutes actuarially reasonable for a particular purpose please refer to the actuarial guidance for the given cell within the matrix). The various criteria for being actuarially reasonable include:

a) An assumption representing the best single point estimate of an uncertain outcome
b) The chances are equal that the uncertain outcome will be more or less favorable than the assumption
c) Other conditions as provided within actuarial standards (and usually requiring additional disclosures)—for example, assumptions related to plan provisions that vary asymmetrically may require stochastic modeling and may require additional disclosures.

Comparability—The accounting concept of having accounting results reported by one entity or during one accounting period be prepared on a basis that is consistent with accounting results reported by another entity or during another accounting period. If Generally Accepted Accounting Principles (GAAP) are followed, the intent is that the user of a financial report can compare the results from two different reports and judge whether the performance or position is/has improved or deteriorated relative to the other report.

Contribution equity—In a multiemployer plan, the objective that the contributions by one employer will provide benefits to its employees in a way that is equitable to what another employer's contribution will provide as benefits to its employees. Contribution equity is accomplished by having employers make contributions that are ACTUARIALLY REASONABLE in the long term to provide for the benefits provided to their employees with recognition that if changes are made by an employer that could cause a financial hardship to another employer, additional contributions in the form of WITHDRAWAL LIABILITY contribution may be required.

Cost stability—The condition where, absent intentional changes in pension plan design, plan investment or plan demographics, contributions remain consistent, predictable and minimize volatility between periods.

High quality—A fixed income security is considered high quality if it garners a rating at or above a specific standard from at least one (or two, or all) of the primary rating agencies (for example Aa, Aaa from Moody's—excluding ratings of A as are allowed for investment grade). This standard is more restrictive than INVESTMENT GRADE and indicates a lower likelihood of default. If regulations call for restriction to use of high-quality instruments, those same regulations typically explicitly define the conditions for being high quality.

Interperiod equity—Similar in concept to cost stability but with the condition that changes between periods arising from known events be equitably distributed between those periods. This includes subjectivity as with any definition of equity.

Investment grade—A fixed income security is considered investment grade if it garners a rating at or above a specific standard from at least one (or two, or all) of the primary rating agencies (for example A, Aa, Aaa from Moody's). The standard that must be met is intended to provide that the issuer is likely to meet payment obligations without default.

Liquidity—The ability to settle obligations in the market when they are due. The concept is very similar to the concept of solvency (see SOLVENCY). The difference is that liquidity adds the additional requirement that the ability to meet obligations must be done using market settlements in cash (or if allowed under legal terms, settlement using some other form of market obligation). An entity may be solvent because it has the financial resources to meet obligations, but that same entity may

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NOT have liquidity to be able to settle those obligations if the assets cannot be currently settled in the market and those assets cannot be directly distributed to the party to which the entity is obligated. Examples of solvency without liquidity include an entity that has significant financial resources in the form of real estate or other asset that might have very limited marketability or liquidity. In these examples, the entity has sufficient assets to settle the obligation, but no ability to do so in the current market.

Multiemployer—A collectively bargained plan maintained by more than one employer. Employers maintaining the plan are typically related via industry or labor union, and are often referred to as "Taft-Hartley" plans in the United States.

PBGC premium—References to the PBGC premium refer to payments made by plan sponsors to the Pension Benefit Guaranty Corporation (PBGC). Premiums are required from all plans covered by the PBGC. In general, private pension plans in the United States are covered by the PBGC with the exception of non-qualified pension plans, church plans, plans covering only owners, and plans sponsored by professional firms employing 25 or fewer employees. Premiums consist of a fixed dollar amount per participant, plus, for single-employer plans, a premium based on liabilities in excess of assets (on a basis defined in PBGC regulations and described in the matrix under the PBGC Premiums & Termination column).

PPA (Pension Protection Act of 2006)—Legislation passed in the United States in 2006 regarding the valuation, funding and payment of pension obligations for private single and **MULTIEMPLOYER** pension plans. For additional details regarding PPA please refer to http://www.dol.gov/ebsa/pensionreform.html. PPA was amended in December 2014 with passage of the Multiemployer Pension Reform Act of 2014.

Solvency—The ability to meet obligations when they are due. Solvency refers to the state where current assets are sufficient to meet current obligations (assets equal or exceed liabilities). The concept is complicated by the fact that many pension plans include provisions that behave as embedded options (early retirement provisions, termination of employment provisions, final average salary adjustments affecting past service liabilities) that can change the obligations based on current and future market conditions and plan participant behavior. Additionally assets held by pension plans may include provisions restricting how or when an asset may be sold (for example, insurance products, private placement securities, real estate and nontraditional investments like timber or oil rights). In all cases the goal of solvency is to ensure that obligations will be met regardless of the changes in the factors that affect the obligation.

Steady-state funding—The determination of the lowest contribution rate that will provide for the ratio of assets to expenditures in the 10th year of the projection being the same as the ratio of assets to expenditures in the 60th year of the projection. The concept is similar to **SUSTAINABLE SOLVENCY** in that the focus is on the ratio of system resources to system payments; however, the steady-state funding looks to have the same pool of assets relative to expenditures whereas sustainable solvency looks to have the same ratio of income to expenditures.

Sustainable solvency—The ability to meet all obligations when they are due during the projection period and have an expectation at the end of the projection period that the system will remain solvent indefinitely because the ratio of system income to system expenses at that point in time will be stable or increasing.

Transparency—Accountability with the added provision that information is in no way misleading, no material facts are omitted, and every effort is made to fully disclose information. This is a more robust disclosure than **ACCOUNTABILITY**.

Withdrawal liability—Liability under a plan that is assessed against an employer to provide for the financial stability and solvency of a multiemployer plan. Withdrawal liabilities calculations are complex and details are outside the scope of these matrices; however, the concepts are included within the multiemployer matrices.

Section IV

Additional References

There are many sources of information that are publicly available regarding the topics covered in this document. We have included some of these documents as references here for the interested reader. Please note that all material noted is the property of the organization publishing this information.

Society of Actuaries Blue Ribbon Panel on Public Pension Plan Funding:
https://www.soa.org/blueribbonpanel/

Conference of Consulting Actuaries Public Plans Community White Paper "Actuarial Funding Policies and Practices for Public Pension Plans":
http://www.ccactuaries.org/publications/news/cca-ppc-white-paper.cfm

U.S. Government Accountability Office report "Pension Plan Valuation: Views on Using Multiple Measures to Offer a More Complete Financial Picture":
http://www.gao.gov/products/GAO-14-264

American Academy of Actuaries Issue Brief "Measuring Pension Obligations: Discount Rates Serve Various Purposes":
http://www.actuary.org/files/IB_Measuring-Pension-Obligations_Nov-21-2013.pdf

American Academy of Actuaries Paper "Fundamentals of Current Pension Funding and Accounting for Private Sector Pension Plans":
http://www.actuary.org/pdf/pension/fundamentals_0704.pdf

Society of Actuaries Pension Section
https://www.soa.org/pension/