

**Canada Pension Plan Investment Assumptions  
Presentation to the National Academy of Social Insurance  
Office of the Chief Actuary, Office of the Superintendent of Financial Institutions  
May 13, 2005**

Good morning. Thank you for inviting me here today to talk about the Canada Pension Plan (CPP) investment assumptions.

**The mandate of the Office of the Chief Actuary (OCA) (Slide 2)**

Let me start by saying a few words about my organization. Although the OCA is housed within the Office of the Superintendent of Financial Institutions (OSFI), it operates independently with a unique role and mandate different from OSFI's. Our primary role is to provide actuarial services to the federal and provincial governments who are Canada Pension Plan (CPP) stakeholders. The Office also conducts statutory actuarial valuations of the Old Age Security Program and pension and benefit plans covering the federal Public Service, the Canadian Forces and the RCMP. While I report to the Superintendent of Financial Institutions, I am solely responsible for the content and actuarial opinions reflected in the reports prepared by my office.

**Funding of the Canadian retirement income security system (Slide 3)**

At retirement, most Canadians will receive an income from one or both of the following pension schemes. The Old Age Security (OAS) Program is financed on a pay-as-you-go basis, which means that there is no fund. The Canada Pension Plan, which is similar to the Quebec Pension Plan, is financed through contributions paid in equal parts by the employer and employees. The contribution rate of 9.9% in 2005 and thereafter will provide a capitalization level equal to approximately 25% of the Plan's liability within about 15 years. Lastly, private pension plans and RRSPs are fully funded, which means that each generation pays for its own benefits. A diversified funding approach allows Canada's retirement income system to be less vulnerable to changes in economic and demographic conditions than systems in countries that use a single funding approach. In addition, the Canadian approach based on a mix of public and private pensions is an effective way to provide for retirement income needs, according to international organizations.

**Income Replacement Rates (Slide 4)**

At 50% of average earnings, the Canadian public pension plans are more generous than the social security of the United States. The replacement rates for both countries are about the same for workers with an income equal to average earnings. However, for high-income earners, the social security system of the United States is more generous than the Canadian public pension plans.

## **Canada Pension Plan Funding (*Slide 5*)**

When it was introduced in 1966, the CPP was designed as a pay-as-you-go plan, with a small reserve. This meant that the benefits for one generation would be paid largely from the contributions of later generations. Continuing to finance the Plan on a pay-as-you-go basis would have meant imposing a heavy financial burden on Canadians in the workforce after 2020, which was deemed unacceptable by the federal and provincial governments. Following extensive consultations across Canada in 1996, governments agreed on these principles: fairness, affordability, sustainability, investing in the best interest of members and more funding.

*(Slide 6)* As a result of the consultation, the provincial and federal governments agreed to change the funding approach of the Plan to a hybrid of pay-as-you-go and full funding, called steady-state funding. The contributions were increased, the future growth of benefits was reduced and the CPP Investment Board was created to invest the funds not required by the CPP to pay current benefits.

## **Risk/Return of Asset Classes (*Slide 7*)**

To achieve higher returns than bonds, the CPP Investment Board must acquire assets that have greater risk. The most logical choice of the CPPIB, at least initially, was publicly traded equities. History indicates that, over the long term and despite greater volatility including short-term periods of negative performance, equities should provide higher returns than bonds to compensate for the greater risk assumed. The diversification of CPP assets remains a continuing priority to spread portfolio risk among more asset classes and to ensure an asset mix that earns a real return that exceeds four percent.

## **CPP Diversified Investments (*Slide 8*)**

CPP Assets are invested in two broad categories: variable-income securities and fixed-income securities. The information shown in the most recent annual report of the CPP Investment Board is used to derive our assumption of the projected asset mix. Therefore, our projected asset mix is 65% variable and 35% fixed up until 2020, which is the period where the net cash flows are expected to be positive. It is expected that contributions will be higher than benefits paid for each year until 2021. We expect a transition period that will see a decrease in Canadian equities and an increase in marketable bonds because the annual net cash flows are expected to become negative. Our ultimate asset mix is therefore 55% variable-income securities and 45% fixed-income securities.

**Federal Bond Yield Curve (Slide 9)** The initial yield curve is the federal yield curve as at 31 December 2003. It was developed using the yields of Government of Canada bonds for various years until maturity. The 20-year yield is 2.5%. The ultimate yield curve is assumed for years 2015 and onward. The 20-year yield on the ultimate curve is 2.85%, which is the average yield on 20-year Government of Canada bonds over the last 60 years. The yield curves for years in between 2003 and 2015 are found by linear interpolation.

**Bond Portfolio (Slide 10)** In developing the assumption about the bond portfolio that CPP assets would be invested in, it was necessary to make assumptions regarding the composition of the bond portfolio and the expected rates of return for each bond type. The historical mix of the Scotia Capital Universe Index shows a trend towards an increase in the proportion of corporate bonds and a decrease in the proportion of federal and provincial bonds. This, along with the existence of a non-marketable bond portfolio (which decreases the need to buy federal bonds) led to the assumption of the bond portfolio mix: 20% federal / 40%provincial / 40% corporate. The CPPIB provided provincial mid-market spreads that were used to calculate a weighted average provincial spread of approximately 40 bps for the provincial bonds. The 100 bps spread of corporate bonds over federal bonds was determined by analyzing the spread of long corporate bonds (with ratings of AA, A, and BBB) in the Scotia Capital Debt Market Index over long federal bonds for the last 18 years. Using the bond portfolio mix as weights, a weighted average return of 3.4% was calculated for the marketable bond portfolio.

**Equity Risk Premium (Slide 11)** Equity risk premium is the expected excess return on equity over a long-term fixed income investment, such as riskless Government of Canada bonds. Recent articles have placed the equity risk premium in the range of – 1% and 4.25%. The equity risk premium that results from the investment assumptions is around 2%. Thus, the CPP equity risk premium lies within what is considered an acceptable range. Over the past 50 years, ending in 2003, the Canadian equity risk premium, as determined using the S&P/TSX Index, is 2.6%, while the U.S. equity risk premium over the same period is 4.5%, as determined by the S&P 500 Index.

**Real Rate of Return (Slide 12)** This table summarizes the assumed real rates of return by asset class for the CPP. The assumption for Canadian equities of 4.6% is equal to the average return of the S&P/TSX Index over the past 35 years. Foreign equities include both U.S. equities (mainly S&P 500), as well as World equities that exclude the U.S, such as the MSCI – World excl. US Index. A 5% real rate of return on foreign equities was determined by considering the returns of these indices over the past 35 years. The real rate of return for real estate and infrastructure was set at 4.0%, which is below the average real rate of return for the Russell Canadian Property Index over the

past 25 and 30 years. The reason for this is that, in general, the returns on real estate and infrastructure should fall between the returns on equity and bonds. For fixed income securities, the rate of return for marketable bonds was set at 3.4% and the return on cash or short-term investments was set at 1.5%. Using the asset mix as weights, a weighted average rate of return on all CPP assets was calculated as 4.1%.

**Independent Peer Review Report (Slide 13)** In January 2005, an independent panel reviewed the work and results of the 21st Actuarial Report on the Canada Pension Plan. The report written by the reviewers was made public on 9 May 2005. In that report, the reviewers discuss the assumptions regarding real rates of return for the different assets classes. This table shows the rates of return suggested by the panel. The panel states that they would have selected a slightly lower ultimate real rate of return on bonds and a considerably higher real rate of return on stocks. The panel's assumptions result in an ultimate real rate of return of 4.6%, as opposed to our assumption of 4.1%. Their equity risk premium was set at 3.3%. The review panel states in their report that "In our opinion, the 4.1% assumption for the ultimate annual real rate of investment return on assets is within, but near the bottom of, the reasonable range. We would, however, select a best-estimate assumption in the neighbourhood of 4.6%."

**Expectations of the CPPIB (Slide 14)** The CPPIB has diversified the CPP reserve fund away from being invested completely in government bonds to including variable income securities such as equities, real estate, and infrastructure. In the CPPIB 2004 Annual Report it says, "As a result of this diversification, the CPP Investment Board expects to earn a 4.5% real rate of return (that is, above inflation) over the long term..."

**Asset/Expenditure Ratio (Slide 15)** The steady-state funding requires that the contribution rate be set no lower than the lowest rate expected to ensure the long-term financial stability of the Plan without recourse to further rate increases. The current steady-state funding is expected to generate contributions that exceed the benefits paid out every year between 2004 and 2021. Funds not required to pay benefits are transferred to the CPP Investment Board for investment. As a result, Plan assets will cover an increasing number of years of expenditures over this period more than five years after 2020. Over time, this will create a large enough reserve to help pay the growing costs that are expected as more and more baby boomers begin to collect a retirement pension. CPP and QPP assets are projected to represent 17% of the GDP by 2020.

**CPP Steady-State Financing (Slide 16)** At the time of the amendments and according to the actuarial report produced in September 1997, the steady-state contribution rate was deemed to be 9.9% in 2003 and to remain at that level for the years thereafter. As a result, the legislated contribution rate is 9.9%. Under the last actuarial report, the

steady-state rate now stands at 9.8%. If the legislated contribution rate is higher than the calculated steady-state rate, the funding status of the Plan will increase over time. The higher this rate is set above the steady-state rate, the faster the Plan will become more funded, as is shown in the previous graph.

**(Slide 17)** On the other hand, what would happen if, in future actuarial reports, the calculated steady-state contribution rate is higher than 9.9%? The default provisions in the *Canada Pension Plan Act* may result in adjustments being made to the contribution rate and, perhaps, benefits in payment if the federal and provincial governments reach no agreement in response to the actuarial determination of the steady-state contribution rate. If the new steady-state rate is 10.1%, one half of the excess of the new steady-state rate over the 9.9%, that is 0.1%, will apply to an increase in the contribution rate and the other half will apply to non-indexation of benefits in payment in order to keep the steady-state rate at 10.0%. In other words, the contributors and the beneficiaries would equally support the additional cost shown in the actuarial report.

**Projecting Diversified Investments (Slide 18)** If the CPP reserve fund was invested solely in long-term federal bonds, the steady-state rate would be 10.5%. This illustrates the need to diversify the CPP investments into different asset classes in order to earn a higher return. Using our anticipated asset mix of 65% variable income securities and 35% fixed income securities, a steady-state rate of 9.8% results. As a sensitivity test, we looked at the steady-state rates that would result due to significant changes to equity returns over two consecutive years. If negative returns of -10% occurred in years 2005 and 2006, the steady-state rate would be 9.9%. If the same negative returns occurred in 2017 and 2018, the steady-state rate would be 10.0%. If positive equity returns of +20% occurred in 2005 and 2006, the resulting steady-state rate would be 9.7%. If the same positive returns occurred in 2017 and 2018, the steady-state rate would be 9.6%.

Thank you.