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A Cost-Benefit Analysis of the Ontario Retirement Pension Plan

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Executive Summary

This report is based on the results of our economic cost-benefit analysis of the Ontario Retirement Pension Plan (ORPP). The ORPP is designed to provide a steady source of retirement income for Ontarians who do not have an adequate workplace pension plan. As our population ages and life expectancies rise, the issue surrounding retirement readiness is becoming more important. And recent studies and data suggest that many Ontario residents are not saving enough to support themselves in retirement.

Our analysis looked at the impact of the ORPP over an extended horizon (2017–93) to assess whether the long-term economic benefits arising from the pension plan outweigh the short-term loss in economic output. Among the factors to be accounted for in the analysis was how disposable income and consumption levels would change as a result of the ORPP. Our analysis also examines the impact of the expected reduction in Employment Insurance and Workplace Safety and Insurance Board premiums, and how those could mitigate the transition with the ORPP. Finally, we examined the economic effect of the ORPP from the perspective of net present value (NPV). Given that the ORPP benefits will occur far into the future while its costs will start to be felt in 2017, a NPV helps assess the overall benefit of the ORPP to Ontarians.

Our results show that the introduction of the ORPP results in a long-term increase in income that offsets the small negative effect on the Ontario economy over the near-to-medium term. Even some of the immediate negative impacts are mitigated by other developments in the economy. The increase in mandatory savings through the ORPP initially results in a period of reduced household spending as contributions to the ORPP lower household income. However, the negative effect on Ontario's GDP in the near term is partially offset by the fact that as individuals begin to contribute to the ORPP, they are expected to reduce their own Registered Retirement Savings Plan savings by almost one-third of the ORPP contribution amount. The impact on overall real GDP is also offset by a fall in imports as less household spending is used to buy foreign goods and services. This has a mitigating effect on GDP growth. In addition, the decline in domestic demand will lower inflationary pressures, keeping interest rates slightly lower leading to a slightly lower value of the Canadian dollar which boosts export demand. If we include the expected decrease in EI and WSIB payroll premiums in our results, we find that these reductions further mitigate the short-term economic impact of the ORPP.

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In the long term, the impacts from the ORPP are entirely positive, as benefits paid from the plan exceed contributions. By 2045, real disposable income in Ontario is higher than it would have been without the ORPP. Retirees spend the additional income from the ORPP benefits, which leads to rising economic activity. In 2093, real disposable income is \$19.4 billion—or 1.2 per cent—higher than it would be without the ORPP. Some of the large increase in domestic savings is also re-invested in Ontario's economy, boosting business investment. The higher consumer and investment spending results in real GDP being \$9.6 billion higher by the end of the forecast period than it would be without the ORPP.

The net present value accounts for the fact that the benefits of the ORPP occur far into the future while many of its costs occur today. To derive the NPV, we use a discount rate to reflect the different economic impacts over time associated with a long-term program such as the ORPP. We estimate that, after accounting for the NPV, the creation of the ORPP will generate \$39.7 billion in GDP over the forecast period from 2017 to 2093. The NPV of the impact on household disposable income alone (the target of the ORPP) is \$28 billion. This suggests that, even after accounting for the fact that Ontario residents place more value on income earned in the near term than they would on income earned decades in the future, the ORPP still has a strong positive effect on Ontario households.

While the purpose of this report is to assess the economic impact of the ORPP, it is important to note that the ORPP is a social policy designed to narrow the retirement income gap between Ontarians with a pension plan and those without. At a time when workplace pension plans are declining, a public pension plan can be a cost-effective way to increase savings and allow Ontarians to better prepare for retirement. The design of the ORPP will benefit plan members through lower average financial management costs (higher management fees faced by the average investor can shave up to 45 per cent off the value of their investments upon retirement), the sharing of market risk (particularly near retirement when a market downturn could significantly affect retirement income), and eliminating the risk of outliving one's savings (a significant worry for many).

1. Introduction

This research conducts an economic cost-benefit analysis of the proposed Ontario Retirement Pension Plan (ORPP). The report was commissioned by the Ontario Ministry of Finance to fulfil the legislative requirement in the *Ontario Retirement Pension Plan Act, 2015*. The ORPP is a social policy designed to narrow the retirement income gap between individuals with a pension plan and those without. Policy actions—even those designed with social goals—have the potential to impact the economy and, therefore, it is important to understand how the economy will react to this policy change.

The ORPP is designed to provide a steady source of retirement income to Ontarians without a comparable workplace pension plan. The ORPP is designed to be similar to the Canada Pension Plan (CPP) in that retirement benefits would be determined by members' income across their contribution period and by the number of contributing years. A major difference between the plans is that the yearly maximum pensionable earnings—the earnings that are subject to pension deductions—are much higher in the ORPP. Additionally, unlike the CPP, which provides a person with an income tax credit for contributions, ORPP contributions are expected to be deductible in calculating taxable income, as the plan is being designed as a registered pension plan under the *Income Tax Act*. A CPP enhancement that would apply nationwide (with adjustments for Quebec) has been discussed at the national and provincial levels. Under most circumstances, CPP enhancement would likely apply more broadly to employers and employees than the ORPP would in Ontario, though many defined benefit plans do adjust accordingly.

The ORPP will redistribute and add to income and consumption spending over an individual's lifetime. By increasing the pool of total savings, the ORPP will increase future incomes and consumption as individuals receive and spend their retirement pensions. The overall impact to incomes and consumption will be positive in the long term. Despite this, the effect of increased savings will have some slight adverse effects in the short term. By saving more—through the ORPP—individuals are expected to reduce current consumption, and this will have a temporary negative impact on the economy. The decline in consumption is expected to be partially offset by a reduction in personal saving, as a portion of savings are redirected toward the ORPP. It will also be offset by a drop in income taxes as contributions to the ORPP are expected to be tax deductible.

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This research estimates the impact of the ORPP over 75 years to evaluate whether the long-term economic benefits of the plan outweigh the loss in economic output associated with the ORPP. We began by creating a long-term economic forecast for Ontario. This forecast is referred to as the “base case scenario” and is used to measure the impact of policy changes like the ORPP. We used the base case long-term outlook and our detailed econometric model of the Ontario economy to estimate the impact of employee and employer contributions to the ORPP, ORPP benefit payments, and the expected impact on private savings and investment. These changes flow through the model and impact a range of variables as the economy adjusts. The long-term impacts are further adjusted to a “present value” estimate to determine if the net impact of the ORPP is positive or negative.

Section 2 of the report outlines the policy rationale for the ORPP and its key features. In section 3, we provide an overview of the methodology and assumptions used to calculate the economic impact of the ORPP. Section 4 discusses the projection results for ORPP contributions and benefits. Section 5 presents our analysis of the economic impact of the ORPP. In section 6, we examine the impact the ORPP will have on the income of few representative individuals in the province. This section also summarizes the distributional impact of our results across individuals. Section 7 summarizes the Conference Board’s findings.

2. The Case for a New Ontario Pension Plan

The ORPP was introduced in Ontario’s Budget 2014 to strengthen the retirement income foundation in the province. As Ontario’s population ages and life expectancies rise, the issue of retirement readiness is becoming more important. Recent studies and data suggest that we may be saving insufficient funds for retirement.

Canadians currently depend on a tiered retirement income system to support them in retirement. The first tier of Canada’s retirement system consists of old age security (OAS) and the guaranteed income supplement (GIS). The second tier is the Canada Pension Plan/Quebec Pension Plan (CPP/QPP).

A single retiree with no other source of income could expect to receive \$1,343 per month in OAS/GIS payments. Pensioners who qualify for the CPP do better, but surrender their claim to GIS support. For a single CPP beneficiary, monthly GIS payments are reduced by 50 cents for every dollar in income from \$773 per person to zero as income reaches \$20,780 a year (including \$3,500 in exempted income). The

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maximum CPP and OAS benefit equals \$19,619, and most pensioners have at least some investment income; as a result, most pensioners who were employed full time receive little in the way of the GIS.

Although the public system does a good job of preventing poverty in retirement, individuals who depend only on the first two tiers of the retirement system will maintain only a modest lifestyle.

Retirement planning literature suggests workers should plan to have an income in retirement of at least 70 per cent of employment income. For any but the lowest-income cohorts, the CPP and OAS/GIS tiers are inadequate. Yet, an increasing number of employees find themselves without a workplace pension plan—arguably the most efficient method of providing income in retirement. For these individuals, it is critical to have sufficient savings outside of the public system. Yet, for a number of reasons many individuals fail to save enough for retirement.

A 2012 report by McKinsey & Company found that almost one-quarter of Canadians are not saving enough for retirement.¹ Similar results were found in the Aegon Retirement Readiness Survey 2015, which suggests that 33 per cent of Canadians are not confident that they will have a comfortable lifestyle in retirement.² These findings are corroborated by recent tax data from the Canada Revenue Agency, which show that only about 30 per cent of Ontario tax filers, who currently make more than \$20,000 a year, contribute to a workplace pension plan.³ Excluding those with a workplace pension plan, just 18 per cent of tax filers contribute to a Registered Retirement Savings Plan (RRSP), the main savings vehicle for those without a pension plan. That means that over 50 per cent of Ontarians making more than \$20,000 do not have either a pension plan or make contributions to an RRSP.⁴ Overall, the average contribution to an RRSP equalled 6.5 per cent of income, which is well below the value accumulated in the average defined benefit plan of 9.8 per cent of employment income.

¹ McKinsey & Company, *Are Canadians Ready for Retirement? Current Situation and Guiding Principles for Improvement*. (Toronto: McKinsey & Company, 2012).

² Aegon, *Canada Country Report, Inspiring a World of Habitual Savers: The Aegon Retirement Readiness Survey 2015*. (The Hague: Aegon, 2015). www.aegon.com/Documents/aegon-com/Research/2015-Retirement-Survey/Canada-2015-Retirement-Readiness-Report.pdf (accessed November 27, 2015).

³ The sample size was restricted to those earning above \$20,000, as those earning below \$20,000 generally have sufficient replacement income in retirement from CPP and OAS.

⁴ Data calculations are from the Canada Revenue Agency's Final Statistics 2010 using tables 2 and 11A–11D. <http://www.cra-arc.gc.ca/gncy/stts/gb08/pst/fnl/menu-eng.html>

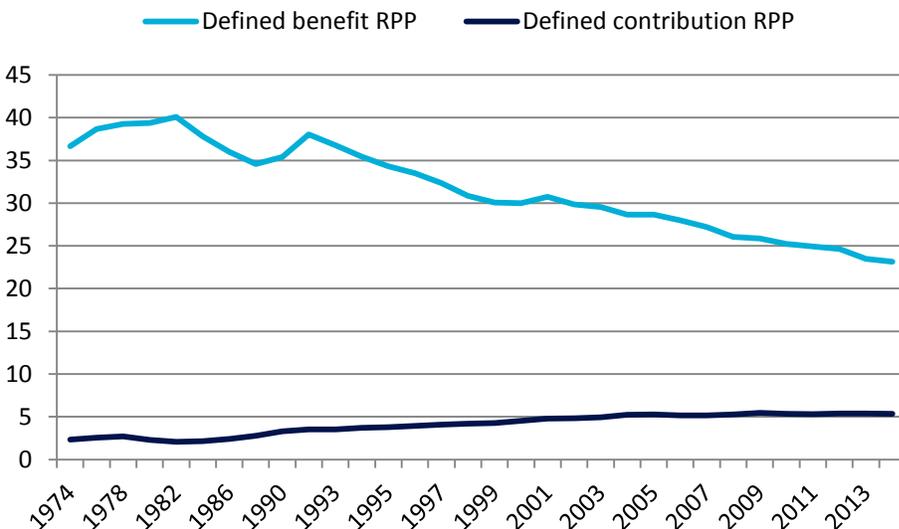
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Although Tax Free Savings Accounts (TFSA) have become a complement to RRSPs as a vehicle for retirement savings in recent years, including them in the analysis has no substantial impact on the picture. While 4.4 million Ontarians held a TFSA, the average value of these savings was only \$10,700 per person in 2013, the most recent year of data. In 2013, net contributions averaged \$2,300.

Further encouraging the government to expand the public pension system is the decline of workplace pension plans. (See Chart 1.) In the early 1980s, 40 per cent of Ontario workers were covered by a defined benefit pension plan—by 2014 that share had fallen to just 23 per cent. The number of workers covered by a registered defined contribution plan has increased over the last few decades, to reach 5 per cent in 2014. However, this has been insufficient to offset the decline in defined benefit plan members; taken together, only 28 per cent of Ontario workers were members of a registered pension plan in 2014. If this declining trend in pension coverage persists, as it is expected to, an increasing share of Ontario workers will not have pension coverage.

Chart 1

Pension Coverage in Ontario
(per cent of employees in a registered pension plan)



Sources: The Conference Board of Canada; Statistics Canada.

To help build a more secure retirement system for future Ontarians, the Government of Ontario is introducing the ORPP. The ORPP is being designed to provide a reliable stream of retirement benefits similar to the CPP. The ORPP will provide a pension of up to 15 per cent of an individual's pensionable

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earnings (up to \$90,000). The *Ontario Retirement Pension Plan Act, 2015* states that the ORPP will be mandatory for individuals employed in Ontario who are between 18 and 70 years old and who do not have a comparable workplace pension plan. Self-employed and those who work in federally regulated sectors are unable to participate in the ORPP at this time.

The ORPP is designed to complement the CPP, which pays a benefit of 25 per cent up to a maximum income of \$52,500 (adjusted annually) per year. (See Table 1 for a breakdown of current average and maximum income payments from government programs.)

Table 1

Monthly Retirement Benefit Payments

(\$)

	Average (July 2015)	Maximum (2015)
CPP pension (at age 65)	640.23	1065.00
OAS pension	531.85	564.87
GIS (single)	453.31	765.93

Source: Service Canada Quarterly report of Canada Pension Plan and Old Age Security monthly amounts and related figures—July to September 2015.

The ORPP will be funded equally by employees and employers for a total contribution rate of 3.8 per cent, up to a maximum earnings threshold of \$90,000. For those without a current pension plan, enrolment in the ORPP will be phased in over three years beginning in 2017 with the largest firms (those with more than 500 employees). Additionally, in the fourth year, those without a comparable pension plan will be phased in. The contribution rate will also be phased in and will not reach 3.8 per cent for all participants until 2021. (See Table 2.) Benefits from the ORPP will be paid beginning in 2022.

Table 2

ORPP Contribution Rates

	Combined contribution rates (per cent)				
	2017	2018	2019	2020	2021
Wave 1 —Large employers	1.6	3.2	3.8	3.8	3.8
Wave 2 —Medium employers		1.6	3.2	3.8	3.8
Wave 3 —Small employers			1.6	3.2	3.8
Wave 4 —Employers with plans ineligible for exclusion				3.8	3.8

Source: Ontario Ministry of Finance.

Although the provincial and federal governments have done a good job of eliminating poverty among seniors, the decline of the workplace pension and a lack of private savings suggest an increased role for government. The ORPP also has a lot of advantages over RRSPs—the traditional method of savings for those without a workplace pension plan. Individuals will not have to worry about market risk near retirement which would otherwise force them to shift into safer investments that would likely also have a lower rate of return. Individuals will also not have to worry about outliving their benefits—a significant worry among those with retirement savings. Finally, public sector plans have substantially lower management fees than other investment tools.

3. Methodology and Assumptions

Estimating the long-term economic impact of the ORPP was a multi-step process. First, it was necessary to estimate how many people will contribute to the ORPP and the total value of annual contributions. Then the estimated number of beneficiaries and the value of benefit payments were calculated. Mandatory pension contributions are expected to change the behaviour of firms and individuals. To present a valid and useful analysis of the impact of the ORPP, assumptions regarding the response of these economic agents to the policy change were made. Finally, a long-term economic forecast for Ontario that aligned growth to the province’s underlying potential economic output was created as a base case scenario for the analysis. The methodology and assumptions used herein are explained in further detail in the subsections that follow.

3.1 Modelling ORPP Contributions

This subsection examines how contributions to the ORPP were estimated. First, we describe the steps to establish the baseline contribution levels. Second, we explain how contributions were projected for the years 2017–92 and third, we summarize the assumptions regarding ORPP eligibility that underpin the calculations.

3.1.1 Calculation of Contributions

To calculate ORPP contributions, a baseline contribution level for 2017 was required. To do this we calculated average per capita contribution levels across 19 income cohorts and multiplied them by the total number of estimated workers in each income cohort eligible for the plan in that year. This procedure is described in more detail below.

1. We obtained data on the number of tax returns and the amount of income earned across 19 income cohorts for those tax filers with employment income who did not have a pension. The 19 income cohorts detailed the tax statements for those with no employment income, those with less than \$3,500 in employment income, those with \$3,500 to \$10,000, then were in \$10,000 increments up to \$150,000, and finally for those above \$150,000. This was available for the 2012 tax year from the Ontario Ministry of Finance. We projected the number of tax filers and amount of employment income in each income cohort from 2012 to 2093 based on projected employment and income growth for Ontario from the Conference Board’s Provincial Economic Model. In addition to individuals without existing workplace pensions, workers with defined contribution plans that do not meet certain requirements will be required to contribute to the ORPP. These individuals are included in our analysis. Our estimate of defined contribution plan members who are expected to join the ORPP is discussed in more detail below.
2. It is assumed that workers in federally regulated industries will not—at least initially—be required to contribute to the ORPP. As such, the number of people in each bracket was scaled down by the portion of people in the bracket estimated to be working in these industries. These shares were calculated using tax data provided by the Ontario Ministry of Finance.

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3. Using aggregated T1 tax data,⁵ per capita annual income for ORPP-eligible workers was calculated for each of the 19 income cohorts.
4. Annual per capita pensionable earnings (i.e., the per capita income from which individuals would be required to contribute to the ORPP) were derived for each income cohort under the following assumptions.
 - i) Workers and their employers will not be required to contribute to the ORPP on their first \$3,500 in annual earnings; so, \$3,500 was subtracted from each per capita income figure.
 - ii) Workers and employers will also not be required to contribute to the ORPP from any earnings over \$90,000 per annum in 2014 dollars. As such, the per capita pensionable earnings for workers earning more than \$90,000 (in 2014 dollars) per year were set to \$86,500 (i.e., \$90,000 less \$3,500).
5. Average pensionable earnings for each cohort were multiplied by the contribution rate (1.9 per cent when fully phased in) to determine the per capita contributions for both employees and employers by income cohort.
6. Average per capita contributions for each of the 19 income cohorts were then multiplied by the number of people in each cohort for an estimate of the total ORPP contributions in each income group.
7. Total ORPP contributions for each income cohort were summed to determine the total amount that individuals and employers will contribute to the ORPP.

3.1.2 Contribution Projections, 2017–92

The number of contributors in each income cohort and their corresponding average income were estimated using The Conference Board of Canada's long-term demographic and labour market projections. The methodology is explained in detail below:

1. The total number of tax filers with employment income was projected based on our forecast for employment. The share of tax filers in each income bracket was held constant from 2012 to 2092.
2. Per capita income figures for each income cohort were projected using average annual labour income growth rates for Ontario. We assumed that the ratio of the average income in each of the

⁵ T1 tax data are aggregated data extracted from T1 General Income Tax Forms which contain the information filed in a personal income tax return.

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19 income cohorts to the overall average income would remain constant. For example, the share of tax filers in the fourth income cohort (between \$10,000 and \$20,000 earned per year) are expected to remain constant through the forecast, at 18.6 per cent of tax filers. In addition, the average income in the cohort is expected to rise in line with overall average earnings.

3. The maximum pensionable earnings were projected based on the average industrial wage while the minimum earnings threshold was held at \$3,500 through the entire forecast.
4. The ORPP will require employees in large companies without any pension plan (with 500 or more employees) to contribute to the plan in 2017. Employees in medium (50–499 employees) organizations will begin contributing in 2018. Employees in small (fewer than 50 employees) companies will begin contributing in 2019. Employees in companies with a defined contribution plan that does not meet the minimum requirements or employees who are not part of a qualifying company pension plan will join the plan in 2020. Data from the Ontario Ministry of Finance were used to determine the share of employees that would be phased into the plan in each wave, and these shares were applied to our forecast for plan contributors.

3.1.3 ORPP Eligibility Assumptions

In establishing the baseline ORPP contribution levels and project contributions over the forecast window, it was important to determine ORPP eligibility.

Workers eligible to participate in the ORPP include those tax filers with employment income greater than \$3,500 and without a comparable workplace pension plan. We also included those with a defined contribution (DC) plan with employer contributions less than or equal to 3 per cent of earnings. Per the government's announcement on August 11, 2015, an employer with a workplace DC plan will be exempt from contributing to the ORPP, if its plan has a minimum total contribution of 8 per cent of base salary earnings, with the employer contributing at least 50 per cent (i.e., 4 per cent of annual earnings). Statistics Canada provides detailed data on contribution rates for registered pension plans and its data showed that the shares of plan members by employee contribution rate was nearly identical to the share of plan members by employer contribution rate. As such, we assumed that in most cases employee and employer contribution rates were similar. We assumed that DC plans with employer contribution rates between 3 and 4 per cent of annual earnings would adjust their rates upward to the minimum level in order to avoid contributing to the ORPP. It would likely be more cost effective for

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those companies to simply increase their current contribution rate. Plans with employer contribution levels below 3 per cent are expected to opt into the ORPP.

At this time, we assumed that self-employed people are excluded from the plan. This is the case as the federal *Income Tax Act* does not currently allow those who are self-employed to participate in registered pension plans. Ontario is exploring options to enable the participation of the self-employed in the ORPP.

3.2 Modelling ORPP Benefits

The estimated number of ORPP beneficiaries was projected by multiplying the population over the age of 65 eligible for the ORPP by the share of the tax filers who contributed to the plan. The population 65 and over was modelled starting in 2017 as the number of individuals turning 65 the following year. The population for each person aged 66 to 110 eligible for the ORPP was then calculated as the population from the last period in the cohort one year younger less the number of deaths.⁶ The population 65 and over eligible for the ORPP was then calculated as the sum of the individuals aged 65 to 110. To estimate the share of the population over the age of 65 eligible to receive a pension, we used the share of tax filers turning 65 paying contributions into the plan. For example, if 40 per cent of tax filers contribute to the ORPP, it is assumed that 40 per cent of people turning 65 will receive a pension. To calculate the pension payable to each beneficiary, eligible beneficiaries were assigned to an income cohort based on the historic share of contributors in each cohort.

Although benefits will not begin to be paid until 2022, the number of beneficiaries starts accumulating as soon as contributions are made. For example, an individual who is 62 in 2017 contributes to the ORPP for three years and then retires; this person is assumed to not receive any benefit in 2020 and, as a result, a backlog of beneficiaries will exist when the plan begins paying in 2022. Consequently, the number of beneficiaries in 2022 is more than the change in the population 65 and over multiplied by the share of contributors. This reflects population change as well as members who became eligible for benefits during the 2017–21 period.

⁶ Death rates were compiled and projected for each age from 65 to 110 and the number of deaths in each age group is the death rate_{*i*} multiplied by the population_{*i*} for *i* = 65 to 110.

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After obtaining an estimate of beneficiaries corresponding to each income cohort, the next step is to calculate the benefit payments for each income group. New benefits by income class are a function of average per capita income over the last five years, the number of years contributing, the number of beneficiaries in that income class, and the accrual rate (.375 per cent). Total benefit payments by income group are determined by the benefit payment in the last period, inflation, and the value of new benefit payments. We then sum the benefit payments by income group to arrive at the total value of all ORPP benefit payments.

3.3 Modelling the Response of Economic Agents

The ORPP is expected to change the behaviour of economic agents. In this analysis, we considered several distinct responses as a result of the ORPP implementation: changes in personal savings behaviour, changes in wages and/or employment levels by firms, any changes to government OAS payments and guaranteed income supplements (since the pension plan is expected to raise retirement income levels), and changes in domestic investment in response to an increase in domestic savings.

3.3.1 Changes in Savings Behaviour

One of the major questions that arises with the introduction of a new, or changes to an existing, public pension plan is the impact that the change in mandatory savings will have on discretionary savings behaviour. The academic literature on this topic does not provide a consensus on the expected behaviour change that accompanies pension changes.

Chetty and others examined the change in savings behaviour in Denmark in response to the Mandatory Savings Plan of 1998 that required individuals to contribute 1 per cent of earnings (after a minimum threshold) to a retirement savings plan.⁷ In this research, the authors found that the 1 per cent increase in government savings lifted savings by nearly 1 per cent of earnings, suggesting that there was almost no impact on private savings when pension contributions were raised.

⁷ Raj Chetty, John Friedman, Søren Leth-Peterson, Torben Heien Nielson, and Tore Olsen, *Active vs Passive Decisions and Crowd-Out in Retirement Savings Accounts: Evidence From Denmark*. Harvard Kennedy Research School Faculty Research Working Paper Series (January 2013). www.rajchetty.com/chettyfiles/crowdout.pdf (accessed November 21, 2015).

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On the other hand, recent work by the Fraser Institute found a much stronger personal savings response.⁸ Examining the personal savings response to an increase in CPP premiums, Vaillancourt and others found that a one percentage point increase in CPP contributions reduced personal savings by 0.895 percentage points. This indicated that there was almost a one-for-one reduction in personal savings. However, the authors also looked at the savings substitution rate from the perspective of household income and also concluded that there is a larger drop in savings rates for low-income households and no significant change in savings for higher-income households.

Other researchers have studied the same issue with findings across a spectrum, with the near zero impact in the Chetty and colleagues' study to the nearly full offset in the Vaillancourt and colleagues' study. Given the lack of definite evidence on the magnitude of the substitution impact we used detailed T1 data which provided a wealth of information on savings rates by individual income class. Using this detailed information on savings behaviour provides us with the ability to individualize the savings response by income group rather than making a blanket assumption regarding the savings response. To capitalize on this information, it we used the information regarding the response by income group from the Vaillancourt and colleagues' study to guide the assumptions employed in this analysis.

The implicit RRSP contribution rates from the T1 data suggest that some lower-income groups would be unable to fully offset their savings due to the ORPP, as their RRSP savings are lower than the after-tax contribution required by those income classes. From the study by Vaillancourt and others, it is expected that higher-income earners are unlikely to materially change their savings behaviour. Considering this, it was assumed that lower-income earners (those earning employment income below \$40,000) would offset their RRSP savings by the after-tax cost of the increased ORPP contributions. For these income classes RRSP savings were set to zero. Middle-income earners (those earning between \$40,000 and \$90,000) were assumed to reduce their savings by half of the cost of increased mandatory savings.

⁸ François Vaillancourt, Charles Lammam, Ian Herzog, and Pouya Ebrahimi, *Compulsory Government Pensions vs. Private Savings: The Effect of Previous Expansion to the Canada Pension Plan*. (Vancouver: The Fraser Institute, July 2015). www.fraserinstitute.org/sites/default/files/compulsory-government-pensions-vs-private-savings.pdf (accessed November 21, 2015).

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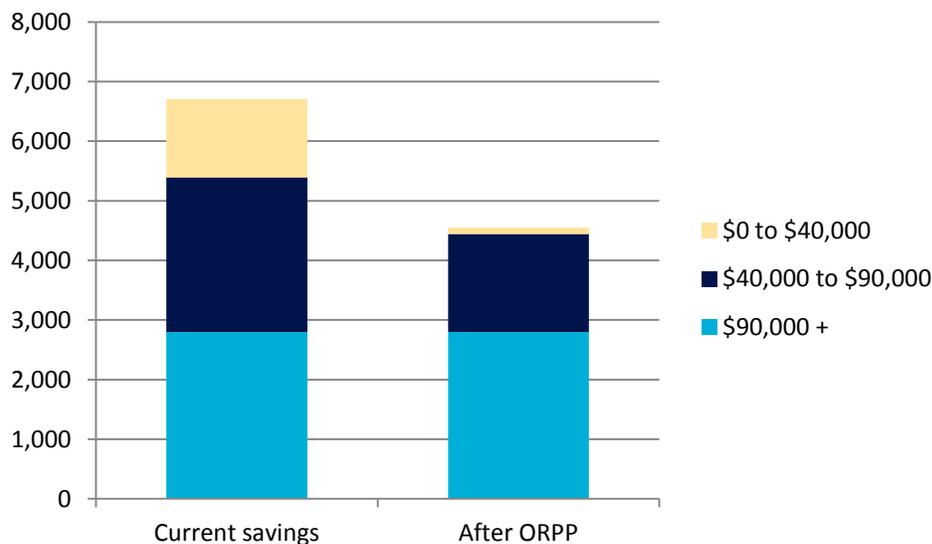
Higher-income earners were not assumed to change their savings behaviour.⁹ The change in savings was calculated by income class based on T1 data that showed total RRSP contributions by income class. The cost of the mandatory savings was derived using total employment income and the after-tax cost was calculated using average personal and corporate tax rates.

The total RRSP savings of individuals without a pension after scaling back savings in income cohorts under \$90,000 resulted in a 32 per cent reduction in total RRSP savings. (See Chart 2.) Therefore, it is assumed that RRSP savings will be reduced by 32 per cent of the after-tax cost of ORPP contributions.

Chart 2

RRSP Savings by Employment Income Group: Current and After ORPP*

(\$ millions)



*calculations use 2012 T1 data aggregated by income class for people without a pension adjustment
Sources: The Conference Board of Canada; Ontario Ministry of Finance.

⁹ Some higher-income earners are likely making maximum RRSP contributions and the introduction of the ORPP will reduce their maximum permissible RRSP contributions, suggesting that there will be some reduction in RRSP savings in high-income earners as a result of the ORPP. However, the purpose of this exercise is to assess the overall impact on private savings and RRSPs were chosen as contribution data were readily available. Higher-income earners are assumed to reallocate their savings portfolio but not reduce their overall savings. As a result, it was decided to leave their RRSP savings unchanged to reflect the fact that no change in their overall savings habits is anticipated.

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The next part of this analysis incorporated the assumption regarding personal savings into our econometric model. It is assumed that there would be a reduction in personal RRSP savings and our model was expanded to include RRSP incomes, contributions, and stock of assets. Data on Ontario RRSP income were collected from T1 statistics for the 2012 tax year.¹⁰ The stock of RRSP assets was obtained from Statistics Canada's Survey of Financial Security.¹¹ From these data, a withdrawal rate on RRSP savings was calculated as RRSP income divided by the dollar value of the stock of RRSP assets. This rate was held constant over the forecast period. RRSP income over the forecast period was then modelled as a function of the withdrawal rate and the stock of RRSP savings.

Using more detailed T1 data summarized by the Ontario Ministry of Finance, we calculated the rate of RRSP contributions out of employment income for those with a pension and those without. For each group (pension and currently without a pension), the RRSP contribution rate out of employment income was calculated for each of the 19 income groups used. These contribution rates were held steady over the forecast, and RRSP contributions by income class were projected as a product of their contribution rate and their employment income. With a projection for contributions and withdrawals, the stock of RRSP savings was forecast as the stock in the previous period multiplied by the rate of return (assumed to be an annualized nominal 6 per cent in this analysis) plus contributions less withdrawals.

The impact on private savings resulting from the implementation of the ORPP is calculated using the baseline estimate for RRSP contributions. Assuming a 32 per cent offset rate, the impact on RRSP savings is equal to the total value of the ORPP contributions paid by employees (directly and accounting for the pass-through costs from employers) multiplied by 32 per cent. The reduction in savings was incorporated into our model in two ways. First RRSP contributions were adjusted down by the offset value. RRSP contributions are therefore lower throughout the forecast, which in turn, reduce the stock of RRSP assets relative to the base case scenario. Since RRSP income is a fixed share of the stock, the

¹⁰ Canada Revenue Agency, *Final Statistics 2014 Edition (for the 2012 Tax Year)*. www.cra-arc.gc.ca/gncy/stts/t1fnl/2012/menu-eng.html#h4-2 (accessed October 23, 2015).

¹¹ CANSIM table 205-0003, *Survey of Financial Security (SFS), Composition of Assets (Including Employer Pension Plans Valued on a Termination Basis) and Debts Held by All Family Units, by Net Worth Quintiles, Canada and Provinces*. <http://app.kevino.ca/open.canada.ca/?p=45e57ef7-b452-4717-867a-b41e947d29ef> (accessed October 23, 2015).

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reduction in the stock of RRSPs leads to lower RRSP income throughout the forecast. However, this reduction in savings does not represent an economic loss: if individuals are not saving this money, they are spending it. As such, the reduction in savings is assumed to result in an increase in consumer expenditures. To account for this, consumer expenditures were increased by the value of the reduction in RRSP contributions.

3.3.2 Changes in Employer Behaviour: Impact on Employment and Wages

Contributions to the ORPP will be split equally between employers and the employees. However, there is some uncertainty in who will bear the final cost of the employers' share. Employers experiencing increased costs in one area are expected to reduce costs elsewhere. Given this, employers could reasonably respond to the ORPP by passing along their higher payroll expenses to workers through lower wages or employment (or both) and through higher prices. Much of the academic research supports the theory that an increase in employer contributions to social insurance plans would lead to a decrease in wages, and possibly employment, to offset higher employer payroll costs.

In recent years, numerous studies have assessed the impact of higher employer payroll expenses on the labour market. Results have been mixed, which is expected given the different approaches used and the challenge in accurately measuring the actual cost to employers.

To assess the potential impact that ORPP employer contributions may have on employee wages and employment, the Conference Board conducted an empirical analysis using an approach similar to that of Roy-Cesar and Vaillancourt.¹² Our findings show that an increase in contributions to social insurance plans is partially passed on to employees through lower nominal wages in the short term. For every one percentage point increase in contributions to social insurance plans, total wages decreased by 0.43 of a percentage point. The overall impact on inflation was minimal.

¹² A wage equation was estimated with contributions to social insurance plans, the CPI, and the unemployment rate as independent variables. We also included labour productivity as an independent variable and conducted our analysis on a per employee basis. The estimation was generated using national annual data, but the results should apply to Ontario as well. See Edison Roy-Cesar and François Vaillancourt, *The Incidence of Payroll Taxes in Ontario and Quebec; Evidence From the Collective Agreement for 1985–2007*. Social Science Research Network, September 24, (2010).

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When examining the potential impact on employment, we applied a similar approach used by Kugler and Kugler¹³ and found a negative relationship between higher employer payroll contributions and employment. According to our estimates, a one percentage point increase in employer contributions to social insurance plans could potentially lead to a 0.08 of a percentage point decline in total employment. These findings align with those of the majority of the literature and support the view that higher employer labour costs are partially passed on to employees via lower wages and employment in the short run.

Many studies indicate that the adverse employment effects observed in the short run will not persist in the long run as employee wages eventually bear the full burden of the increase in employer labour costs following labour market adjustments. According to Bedard,¹⁴ the increase to the employer's payroll expenses is not fully passed on to employee wages in the short term because wages are rigid (due to factors such as minimum wage and negotiated contracts) and take time to adjust. As a consequence of the partial shift to wages, employment could be negatively impacted in the short run as well. In the long run, however, the cost burden to the employer is expected to be fully passed on to the employee through adjustment to compensation and, as a result, any adverse impacts on employment in the short run will be fully dissipated. Despite the short-term increase in employer labour costs, aggregate price levels in the economy are not expected to shift much in response to the plan.

3.3.3 Changes to Social Security Benefits

The ORPP is expected to result in some changes to the dollar value of benefits provided through government social security spending programs. The largest impact is expected to be on the government's OAS/GIS program, which will pay out roughly \$3 billion in OAS/GIS benefit payments across the country this year. The OAS is a means-tested benefit; the payment an individual receives from the program is reduced after a certain income threshold. In 2015, OAS benefits are reduced for income above \$72,809 and are completely clawed back when annual income reaches \$118,055.

¹³ An employment equation was estimated with contributions to social insurance plans relative to total wages as the independent variable. The estimation was generated using national annual data, but the results should apply to Ontario as well. See Adriana Kugler and Maurice Kugler, *Labour Market Effects of Payroll Taxes in Developing Countries: Evidence from Columbia*. The University of Chicago (2009).

¹⁴ *Marcel Bedard, "A Primer on Payroll Taxes in Canada"*. Human Resources Development Canada, January (1988).

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Since the ORPP is designed to boost retirement income, it is expected to reduce OAS payments for individuals whose ORPP pensions will lift them into the range where their OAS payments will be reduced. To account for this, we used extracted T1 data for the population 65 and over to determine retirement income by source. Pension income was excluded from the calculation and overall retirement income from the T1 data was calculated excluding RRSP and OAS income. A baseline for the OAS claw-back amount was calculated using total income less OAS payments. This calculation is assumed to remain constant throughout the projection. Our Ontario model was then used to project retirement income by income class accounting for lower RRSP retirement incomes (resulting from the reduction in RRSP contributions in response to the ORPP) and ORPP pension benefits. The OAS claw back was then calculated based on this revised income stream and the difference between the new OAS claw back and the base case OAS claw back was used to decrease total OAS transfer payments. Holding everything else constant, reduced transfer payments through the OAS program lead to a reduction in household disposable income relative to the base scenario.

3.3.4 Investment Response to Increased Domestic Savings

Our analysis considers what happens when there is a significant increase in an economy's saving rate. This additional savings will be invested domestically, nationally, and internationally.

In 1980, Feldstein and Horioka published a report that found a large portion of incremental savings stayed within their country of origin—a finding that contradicts open market economic theory that suggests that capital mobility should result in funds being allocated on the basis of return maximization.¹⁵

Recent literature has shown that the link between domestic savings and investment has diminished over time as capital mobility has increased.¹⁶ Nevertheless, the relationship between domestic savings and

¹⁵ Martin Feldstein and Charles Horioka, "Domestic Saving and International Capital Flows," *The Economic Journal* 90, no. 358 (1980): 314–29.

¹⁶ See Julien Fouquau, Christophe Hurlin, and Isabelle Rabaud, "The Feldstein-Horioka Puzzle: A Panel Smooth Transition Regression Approach," *Economic Modelling* 25 (2008): 284–99; Domenico Giannone and Michele Lenza, *The Feldstein-Horioka Fact* (Frankfurt, Germany: European Central Bank, 2008).

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investment continues to be observed in the literature, with some studies indicating a stronger relationship, the longer the studied time horizon.¹⁷

Based on strong evidence from the literature that an increase in savings is likely to impact investment, especially over a long time horizon such as the one used in this research, it is assumed that some of the increase in Ontario savings will boost provincial investment levels. Investments in the ORPP are assumed to mimic the asset allocation in the CPP which has invested 15.5 per cent of its portfolio in Canada as of September 2015.¹⁸ We expect this will be invested by the province in a manner similar to recent trends. Ontario's share of national investment over the last five years has averaged 30 per cent. Based on the literature, we expect that 70 per cent of that impact will result in higher capital stock.

3.3.5 Consideration of Other Factors

Contributions to the ORPP are set to begin in 2017—the same timeframe for planned reductions in the employment insurance (EI) contribution rate and expected reductions in Ontario Workplace Safety and Insurance Board (WSIB) premiums. The reduction in EI and WSIB premiums will boost Ontario's economy and provide an important offset to Ontario's economy as it adjusts to the ORPP. The net impact of the combined policy changes (lower EI premiums, reduced WSIB premiums, and the ORPP) is calculated separately in section 5.3.3 and the assumptions utilized in that analysis are detailed below.

As described in the Federal Liberal Party election platform, the EI contribution rate will drop from 1.88 to 1.65 in 2017. It is then assumed to stay at this rate for the duration of the forecast.

The Ontario WSIB premium rate is expected to gradually decline over the 2017–32 period. Under conservative assumptions, the rate is scheduled to fall from \$2.46 to \$2.12 by 2022, from \$2.12 to \$1.75 by 2027, and to finally settle within the \$1.40 to \$1.50 range over the 2028–32 period. Based on the WSIB Ontario 2015 Economic Statement, the reduction from \$2.46 to \$2.12 would result in annual savings of \$742 million by 2022 in 2015 dollars. These amounts will progress to \$1.6 billion by 2027 and

¹⁷ See, for example, Florian Pelgrin and Sebastian Schich, *National Saving—Investment Dynamics and International Capital Mobility* (Ottawa: Bank of Canada, April 2004) or Atul A. Dar, Sal AmirKhalkhali, and Samad AmirKhalkhali, "The Current Account and the Intertemporal Budget Constraint: Evidence From G7 Countries," *International Business and Economics Research Journal* 4, no. 10 (2005): 67–72.

¹⁸ CPP Investment Board, *Frequently Asked Questions*. www.cppib.com/en/public-media/faq.html (accessed December 7, 2015).

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\$2.4 billion by 2032 (in 2015 dollars). (See Table 3.) To conduct the economic impact analysis over the 2017–21 period, we assumed that the annual savings would steadily increase during the five years leading up to 2022. The annual savings would be around \$124 million in 2017, \$247 million in 2018, \$371 million in 2019, \$495 million in 2020, and reach \$618 million in 2021. Since the WSIB has been exceeding its funding targets for some time, premium cuts could occur in a shorter timeline than indicated in the WSIB 2015 economic statement. In such a case, the achieved annual savings and the resulting impact on Ontario’s real GDP would be more significant than estimated using the current assumptions.

Table 3

Impact of Government Policies on Employer Payroll Contributions Enacted from 2017 to 2032
Cost and savings measured when fully effective, in 2015 dollars

Measure	Annual Costs/(Savings) \$ billions	When Measures are Fully Effective
Ontario Retirement Pension Plan (ORPP)	3.1	2021
WSIB Premium Rate Reductions	(2.4)	2028-2032*
Employment Insurance (EI) Rate Reductions	(0.6)	2017
Net Impact	0.1	

* Based on the WSIB 2016 Economic Statement. Could occur sooner if unfunded liability is eliminated earlier and/or the funding sufficiency target changes. WSIB currently projects being 100% funded by 2022.

Furthermore, the federal government is implementing two personal income tax changes—a drop in the middle-income tax bracket and higher taxes on those earning above \$200,000. Taken together, these tax changes are expected to provide a small economic boost to the economy over the near term. The impact of this tax change is not considered in this analysis.

3.4 Base Case Economic Outlook

Ontario’s economy will grow by an estimated 2 per cent this year, driven by increased household spending and residential investment. Consumers are taking advantage of solid wage gains, lower gasoline prices, and higher universal child care benefit payments to increase their real spending by 3.1 per cent. Spending on durable goods has been particularly strong throughout the year, with vehicle sales reaching an all-time record high. While domestic demand has been supporting the economy,

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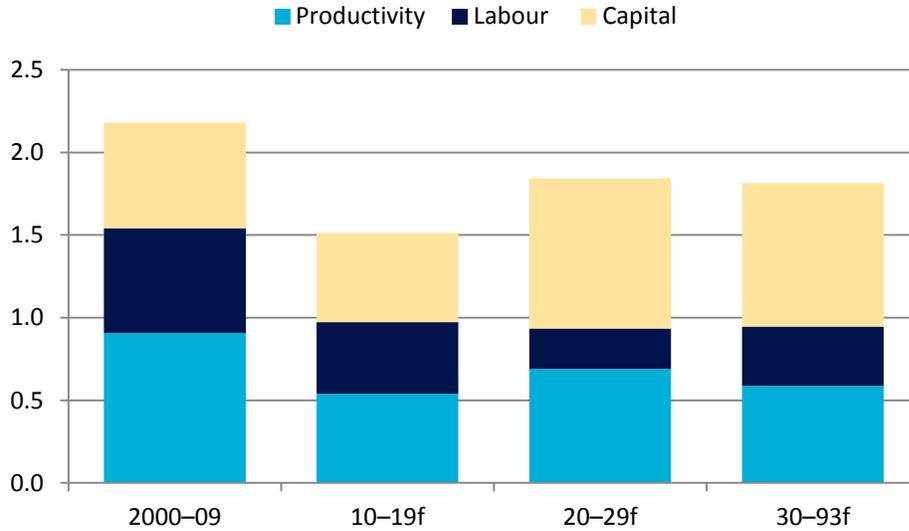
Ontario's economy was held back by weak export growth in the first half of 2015, as a result of a slow start to the year for the U.S. economy and longer-than-usual plant maintenance shutdowns in the auto sector. However, exports picked up in the second half as the U.S. economy rebounded and production at auto plants returned to full capacity.

Over the next two years, household consumption growth is expected to steadily slow as high debt levels necessitate a return to spending aligned with real income growth. Government spending will continue to weigh on economic growth, as the provincial government continues fiscal austerity to eliminate its deficit by 2017–18 as promised. In 2016 and 2017, exports and business investment are expected to pick up the slack, keeping the province's economic growth on track. Exports will be supported by strong demand from the U.S. and a depreciated Canadian dollar. Business investment will accelerate as rising exports encourage capacity-building investment. In 2016, Ontario's real GDP will expand by 2.3 per cent, followed by 2.6 per cent growth in 2017. With the output gap expected to close by the end of 2017 and assuming no significant net impact from cyclical fluctuations (which are impossible to predict with accuracy over the longer term), GDP is forecast to grow in line with its underlying potential—a rate of growth considered neutral that will not lead to inflationary or disinflationary pressures. From 2020 to 2093, potential output is projected to grow by an average of 1.8 per cent, driven by gains in capital investment and productivity.¹⁹ (See Chart 3.)

¹⁹ For a detailed discussion on how potential output is estimated and the forecast for the individual components of potential output, please refer to Appendix B.

Chart 3

Components of Ontario Potential Output Growth
(contribution to growth, percentage change)



Sources: The Conference Board of Canada; Statistics Canada; Ontario Ministry of Finance.

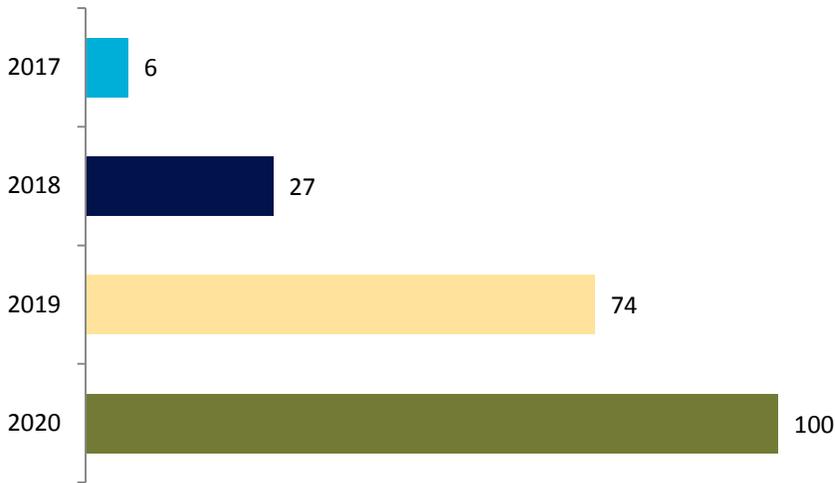
4. Long-Term ORPP Projections

In this section, we discuss our projections for the contributions and benefits from the ORPP. The projections are based on the methodology outlined in sections 3.1 and 3.2 and are used to assess the economic impact of the ORPP discussed in section 5.

Ontarians who earn employment income but have no pension adjustment on their income tax returns are expected to contribute to the ORPP. The estimate is adjusted to exclude individuals in a federally regulated industry or self-employed, as well as those with a comparable DC plan. This provided a total estimate for the share of employees who would be eligible to participate in the ORPP. Eligible individuals were then assumed to join the plan in waves beginning in 2017, with full enrolment in 2020. (See Chart 4.)

Chart 4

Entry of Eligible Individuals Into the ORPP
(per cent)



Sources: The Conference Board of Canada; Ontario Ministry of Finance.

Based on these assumptions, 250,000 Ontarians will join the plan in 2017 and by 2020, 4.2 million will be enrolled.²⁰ Enrolments will continue to increase alongside employment growth and by 2093, 6.9 million Ontarians will be enrolled in the ORPP.

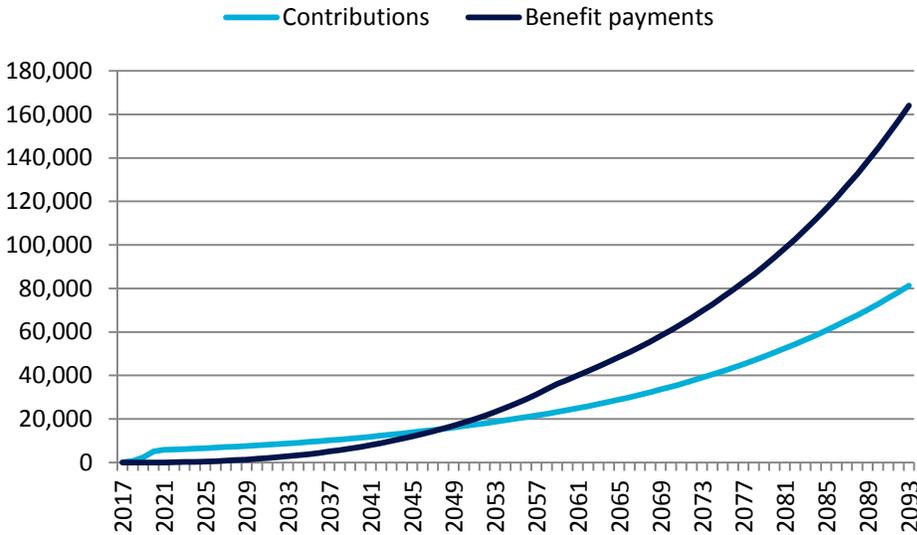
Benefit payments will begin to be paid in 2022 and in the first year of payments, 290,000 people will receive an ORPP payment. The number of beneficiaries will continue to grow over time and by 2093, 2.2 million people will be receiving a lifetime guaranteed, inflation-protected, pension benefit from the ORPP.

The value of the ORPP contributions will increase in line with average wage growth in the economy. Benefit payments are based on the average annual income per person and indexed to inflation. Beginning in 2048, the value of pension benefits will exceed contributions, resulting in a net boost to household incomes in Ontario. (See Chart 5.) Benefit payments will be supported by a combination of past contributions and investment revenues earned on the pension fund.

²⁰ Of the 4.2 million enrolled in the plan, about 470,000 have incomes below the minimum level required to make contributions. These individuals are counted as eligible as over time, their incomes will grow and they will eventually begin contributing to the plan.

Chart 5

ORPP Contributions and Benefit Payments
(\$ millions)



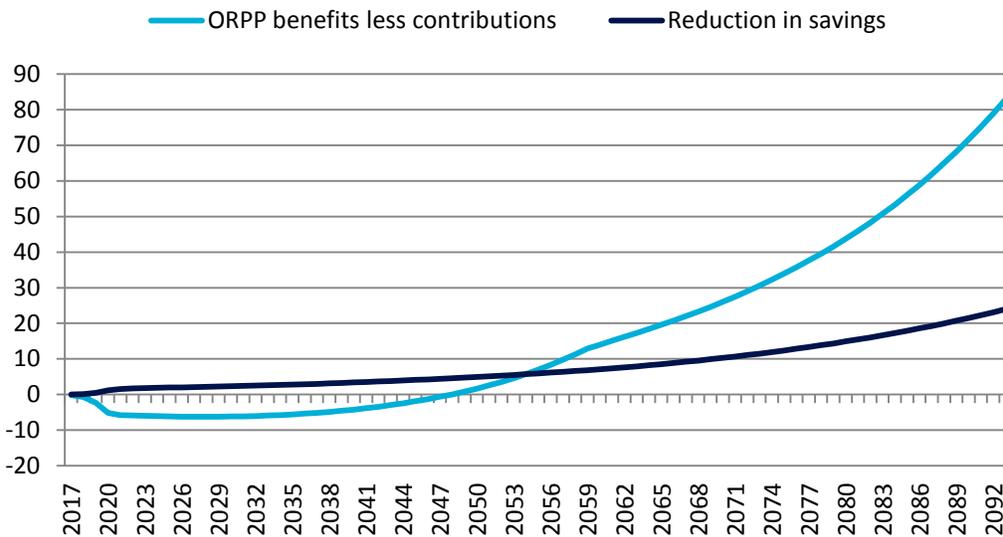
Source: The Conference Board of Canada.

5. Economic Impact of the ORPP

This section discusses the results from the analysis of the economic impact of the ORPP. The results are presented in “shock minus control format.” In particular, we present the impact on key economic indicators of the introduction of the ORPP. In this analysis, the shock scenario includes the impact of the ORPP contributions and the benefits that follow, beginning in 2022. It also includes a reduction in private savings in response to the introduction of the ORPP. (See Chart 6.) Lastly, it also incorporates an investment response to the higher stock of savings in the economy.²¹

²¹ The analysis was originally conducted without considering the impact of higher savings on investment to determine if the results of the analysis were contingent on including this relationship. Our findings show that the results are not reliant on this assumption and that the NPV of the ORPP remains positive at each discount rate used in the analysis.

Chart 6
Initial Impacts Associated With the ORPP
 (\$ billions)



Sources: The Conference Board of Canada; Statistics Canada; Ontario Ministry of Finance.

5.1 Key Findings

The design of the ORPP will benefit its plan members over the long term by providing a secure retirement benefit and a higher level of income in retirement. While this research does discuss some of the main benefits of the program (see section 6), the overarching goal of this study is to estimate what happens to the economy after the introduction of the ORPP. Our findings suggest that the overall impact on the economy is quite small and that over the long term the program has a positive NPV.

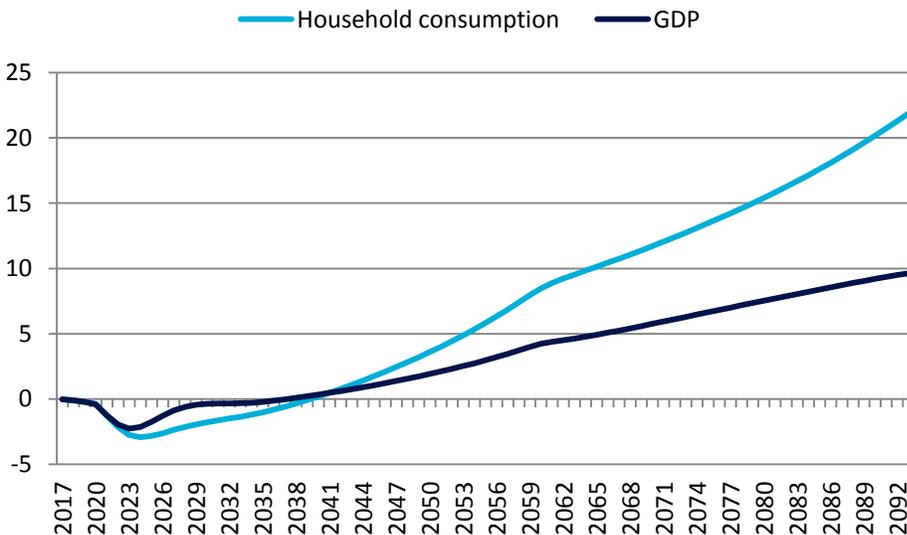
Initially, the ORPP results in a small negative impact on the Ontario economy (approximately 20 years) and a moderately positive impact over the extended long term compared with the base scenario. The increase in mandatory savings through the ORPP results in a period of reduced household spending. However, a number of factors mitigate the impact on GDP. Individuals contributing to the ORPP are expected to reduce their RRSP savings by almost one-third of the contribution amount. The impact on overall real GDP is also partly mitigated by import leakages—a good portion of household spending currently goes to buying foreign goods and services and any reduction in consumer spending also results in lower demand for imported goods. Fewer imports lessen the overall impact on GDP. In addition, higher savings will boost investment spending, as a portion of the savings is forecast to remain in Ontario. Furthermore, the decline in domestic demand will lower inflationary pressures and allow the

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Bank of Canada to keep interest rates slightly lower. That in turn leads to a modest depreciation in the value of the Canadian dollar.

The combination of lower domestic prices and a weaker dollar helps Canada's export competitiveness and also helps to mitigate the initial negative impact on the economy. As such, the near-term impact on household spending exceeds the overall impact on GDP. (See Chart 7.) The ORPP also has an impact on private sector investment. Private investment in machinery, structures, and intellectual property falls relative to the base case scenario during the first part of this scenario (approximately 22 years). Despite an increase in investment resulting from higher savings, weakness in domestic demand dampens corporate operating surpluses, which leads to an overall reduction in investment spending. As the impact of the ORPP turns positive, private investment slowly picks up in response to increases in domestic demand, complementing the increase from higher domestic savings. Ontario's economy is valued at an estimated \$659 billion (in real 2007 dollars) in 2015. The reduction in real GDP from the ORPP peaks at 0.29 per cent (\$2.3 billion) in 2023. By 2093, real GDP rises 0.35 per cent above the base scenario.

Chart 7
Impact on Household Spending and Real GDP
(change from base 2007 \$ billions)



Source: The Conference Board of Canada.

5.2 Detailed Findings

The Conference Board's Ontario economic model provides a detailed account of how the province's economy may evolve over the forecasted period, assuming that past economic relations hold in the future. As projections extend over 75 years, simulation results are sensitive to how private investors react to the changes in the economy. Below is a detailed description of our modelling results covering first the medium-term economic reaction followed by the impacts observed over the long term.

5.2.1 Short to Medium-Term Impacts

Over the medium term, ORPP contributions required by workers and businesses lead to declines in real GDP (compared with the base scenario) from 2017 to 2036. Contributions to the ORPP will begin in 2017 and will be fully phased in by 2021. It will take 40 years of contributions to earn a full pension, meaning that the first of the full pension benefits will be paid in 2056. The annual loss in GDP is forecast to peak at 0.29 per cent (\$2.3 billion) in 2023. The decline in real GDP is largely the result of lower real household spending, down by 0.64 per cent (or \$2.9 billion) in 2024. The ORPP contributions result in a decline in real disposable income and real consumption spending. Real household spending is modestly lower, compared with the base scenario, until 2040.

The decline in domestic consumption leads to a fall in real private investment that peaks at \$939 million in 2024. Firms also cut back on investment spending and employment due to the ORPP premiums and lower profits. However, the impact of these factors is partially mitigated by increased investment spending spurred by higher savings. Employment grows modestly below the base scenario until 2037, with total employment dropping 23,000 jobs below the base case in 2023. Even then, however, they add just 0.2 percentage points to the unemployment rate. Some sectors of the economy are expected to benefit from the introduction of the ORPP. The impact on consumer spending leaves the economy operating below capacity, easing inflationary pressures. Our model incorporates a central bank reaction function and the drop in inflation subsequently results in a more accommodative monetary policy.²² Interest rates decline modestly over a 13-year period beginning in 2017, peaking at 22 basis points in 2024. This results in a mild depreciation of the Canadian dollar against the U.S. dollar, which stimulates

²² A standard Taylor-rule equation that defines the bank rate as a function of the output gap and inflation was incorporated into the Ontario model for this research in order to properly capture the policy response to weaker growth.

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export demand. Simultaneously, higher import prices linked to a lower dollar, coupled with declines in consumption and investment, results in falling imports. The decline in imports peaks in 2023 at \$1.4 billion, down 0.33 per cent relative to the base. The combined impact of lower imports and higher exports leads to an increase in real net exports through to 2040, negating much of the decline in real GDP attributed to the weaker domestic economy.

Overall, our simulations indicate that the economy's potential GDP growth does not change significantly in the medium term as a result of the ORPP. Declining consumption observed in the short term results in economic growth that deviates from its potential. However, through the medium term, the decline in consumption is mitigated by the increase in real net exports, leaving the economy operating at its potential.

5.2.2 Long-Term Impacts

In the long term, the impact from the ORPP is positive, as benefits paid from the plan exceed contributions. This is partially mitigated by lower private investment income as the reduction in private savings from the ORPP slows the accumulation of RRSP assets and results in a reduced flow of RRSP income relative to the base case. By 2038, real GDP catches up to and then surpasses the base scenario. By 2093, real GDP is 0.35 per cent higher (or \$9.6 billion) relative to the scenario without the ORPP.

The positive impact on the economy accelerates over the last half of the forecast, as ORPP benefits boost disposable income which in turn leads to an increase in consumption spending. Real disposable income turns positive in 2046, and by 2093 it is up 1.2 per cent (or \$19.4 billion) compared with the base scenario. Higher domestic demand spurs business investment to meet this higher level of demand. Increased capital investment in turn helps lift the economy's long-term potential. By 2093, potential output is up by 0.31 per cent compared with the base scenario, representing a permanent increase in real income in Ontario.

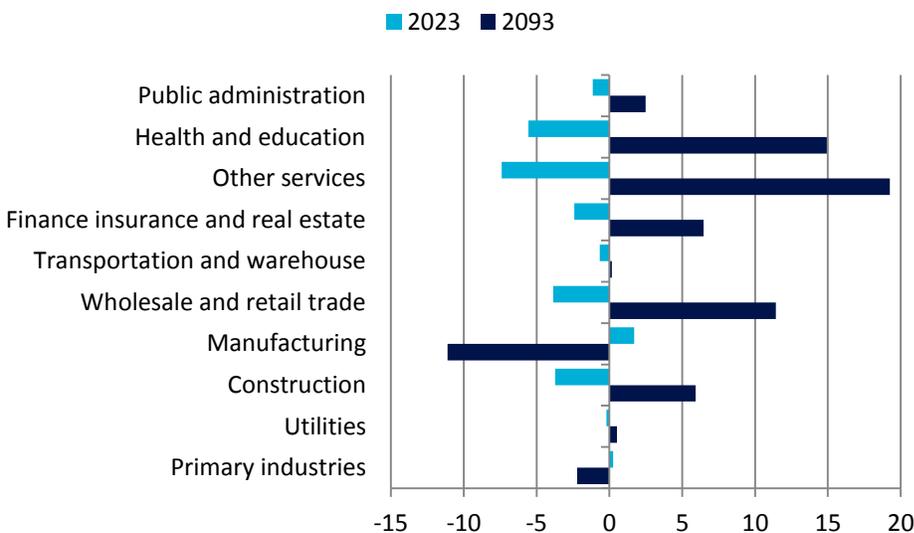
The increase in domestic demand appreciates the Canadian dollar, negatively impacting exports. Increased demand also increases imports. As a result, the impact on net trade turns negative in 2040 and remains negative throughout the rest of the forecast.

Structural changes also occur at the industry level. By sector, services bear a larger share of the short-term decline in output, given the close relationship between spending on services and overall consumer

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spending. The reduction in household and investment spending affects a wide range of services, including wholesale and retail trade, and finance, insurance, and real estate. However, the manufacturing sector improves modestly over the medium term thanks to the higher export demand linked to the weaker Canadian dollar. Over the long term, stronger domestic demand raises employment in the services sector. (See Chart 8.) Manufacturing employment, which increased over the first part of the simulation, declines in the later years as the improved Canadian economy results in an appreciation of the dollar.

Chart 8
Employment Impact by Industry
(change from base, 000s)



Source: The Conference Board of Canada.

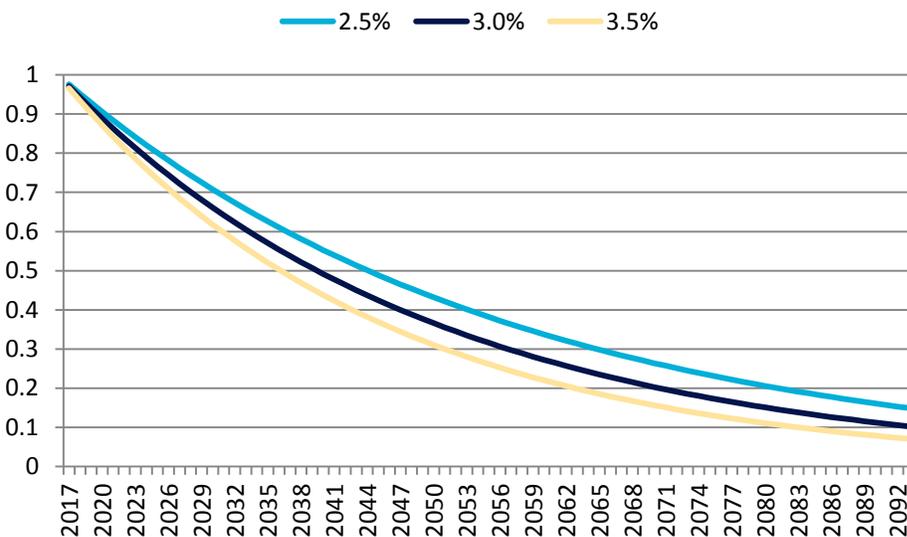
5.2.3 The Net Present Value of the ORPP

The analysis, based on real GDP, allows for a comparison of impacts over time by removing the effect of inflation. Given the long-term impact of the ORPP, it is also useful to include a social discount rate to reflect factors such as time preferences, the cost of borrowing, and the opportunity cost of private capital. By applying the social discount rate to inflation-adjusted benefits, it is possible to calculate the NPV of the ORPP. The discount rate associated with time preference reflects the notion that a dollar tomorrow is far more valuable than an inflation-adjusted dollar received in 50 years. The nominal cost of borrowing is approximated by the 30-year government bond rate, and the opportunity cost of private capital is measured using the 30-year corporate interest rate.

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The current low interest environment has substantially lowered public and private bond rates. Interest rates are also no longer expected to return to their pre-financial crisis peaks but are expected to remain permanently lower.²³ This suggests that the appropriate social discount rate is likely lower relative to past estimates. We estimate that an appropriate real social discount rate in this low interest rate environment is likely approximately 3 per cent. The choice of discount rate alters the magnitude of the impacts in the NPV results. Assuming a 3 per cent discount rate, the impact in 2093 is assigned a weighting of 0.1; this means that every inflation-adjusted dollar in 2093 is worth just 10 cents today. Assuming a 3.5 per cent discount rate, a dollar in 2093 is worth 7 cents today and using the 2.5 per cent discount rate, the dollar of future benefits is worth 15 cents today. (See Chart 9.) Given that the NPV is sensitive to the discount rate chosen, the NPV of the ORPP is calculated using each discount rate considered to provide a range of reasonable estimates.

Chart 9
Net Present Value of \$ Under Different Rate Assumptions
(\$)



Source: The Conference Board of Canada.

²³ Rhys R. Mendes, *The Neutral Rate of Interest in Canada*, Discussion Paper 2014-5 (Ottawa: Bank of Canada, 2014). www.bankofcanada.ca/wp-content/uploads/2014/09/dp2014-5.pdf (accessed October 2, 2015).

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The NPV analysis of the ORPP focuses on the total economic impact measured by GDP and real disposable income.²⁴ Using a social discount rate of 3 per cent, the NPV on GDP from the ORPP is \$39.7 billion and the impact on disposable incomes is \$28 billion. A higher discount rate of 3.5 per cent results in a lower (but still positive) NPV of the ORPP. (See Table 4.) The impact on incomes increases throughout the forecast as benefit payments rise and higher potential output boosts employment and incomes. As such, when a lower discount rate is used (which puts a higher weight on impacts in the outer years), the NPV on disposable income is much closer to the GDP estimate.

Table 4
NPV of the ORPP
(2007 \$ billions)

NPV	Social discount rate		
	2.5%	3.0%	3.5%
Disposable Income	50,448	28,007	11,842
GDP	54,786	39,707	28,447

Source: The Conference Board of Canada.

5.2.4 Economic Impact of the ORPP, Including EI and WSIB Changes

The ORPP will have a small negative impact on the Ontario economy in the short term but this could be partially offset by other factors. For example, the cut to the federal EI contribution rate scheduled for 2017 and the reduction to the Ontario WSIB premiums that is likely to take place during the 2017–32 period will have a positive impact on the Ontario economy and partially mitigate the impact of the ORPP.

In this scenario, we consider the impact of these EI and WSIB premium changes in conjunction with the introduction of the ORPP. All of the assumptions from the initial economic analysis are used in this analysis and those assumptions are supplemented with the expected reduction in payroll taxes.

In this scenario, GDP is positive for the first four years as the impact of reduced EI and WSIB premiums exceeds the impact from the ORPP. (See Chart 10.) This result is expected as contributions to the plan

²⁴ Real disposable income is an inflation-adjusted concept and measures income on an after-tax basis and therefore includes the impact of ORPP contributions as well as its benefit payments.

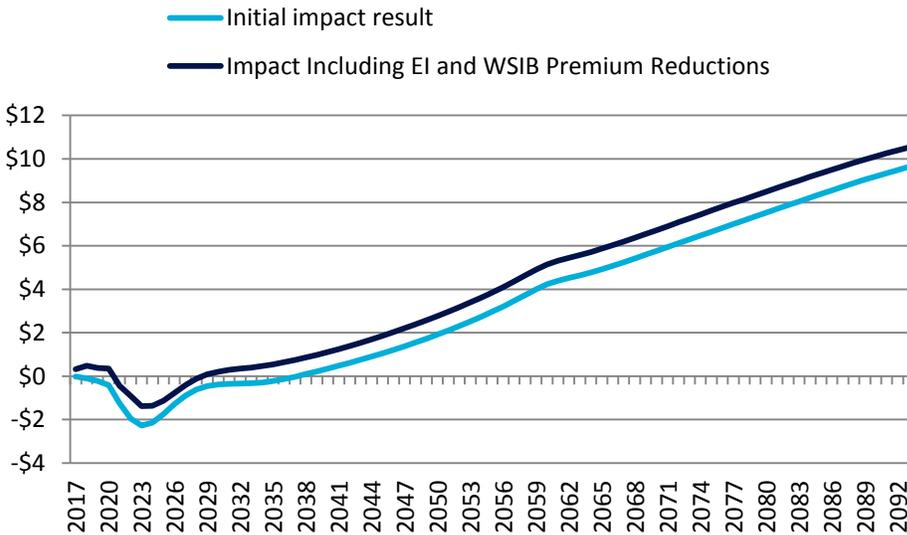
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will be phased in slowly over the first few years. By 2021, the impact from the ORPP outweighs the benefit from the other premium reductions and the total impact on GDP turns negative. The negative impact on GDP peaks at 0.2 per cent (\$1.4 billion) in 2023—a smaller decline relative to the initial shock which saw GDP decline by 0.3 per cent. Real GDP is negative for just eight years in this scenario and rises above the base scenario in 2029—nine years earlier than the initial simulation results.

Chart 10

Impact on Real GDP

(change from base, 2007 \$ billions)



Source: The Conference Board of Canada.

The reduction in EI and WSIB premiums mitigates the impact of the ORPP in the short term and lifts the positive economic benefit over the longer term. By 2093, employment in the province is up by 51,700 jobs relative to the base scenario where employment was increased by 47,800.

The impact on GDP is more positive in this scenario as the reduction in premiums represents a permanent increase in household incomes. It follows that the NPV of this scenario is also much higher. Using a 3 per cent discount rate, the NPV on GDP is \$62.7 billion and disposable income has an NPV of \$63.3 billion.

6. Examining the Distributional Effect of the ORPP

The ORPP will boost aggregate savings and generate a higher level of retirement income for individuals in the years to come. In the following sections we examine the benefits of the ORPP and then consider three individuals of various incomes to see how they might benefit in retirement.

6.1 Are People Better Off in the ORPP?

The ORPP will impact individuals across the income spectrum. Therefore, it is critical to determine if those people not covered by a workplace pension are better off continuing to save on their own or if they are better off in retirement by joining the ORPP. In this subsection, we highlight some of the main advantages in belonging to a public pension plan. These advantages can be broadly aggregated into three categories: closing the savings gap, lower financial management costs, and transferring of risk.

A frequent argument against public pension plans is that many people are already saving enough and increased mandatory savings would be partially offset by reduced discretionary savings, thereby reducing the plan's benefits. As discussed in section 2, many individual's financial retirement plans are inadequate and, therefore, these people would benefit in the long term by increasing their current savings.

It is reasonable to expect that some people will alter their personal savings behaviour in response to a mandatory savings plan. Assuming that lower-income earners do in fact reduce their personal savings by their ORPP contribution amounts and that middle-income earners reduce their savings by half,²⁵ total economy-wide savings still increase substantially with the ORPP. According to our analysis, after accounting for some reduction in personal savings in response to the ORPP, personal household savings increase by an average of 25 per cent thanks to the ORPP.²⁶ By increasing personal savings through the introduction of the ORPP, future retirement incomes in Ontario are higher. This helps alleviate future risks surrounding retirement income adequacy that are resulting from the current under-savings problem.

²⁵ See section 3.3.1 for a more detailed analysis of assumed savings reductions in response to the ORPP.

²⁶ This figure includes the employer contributions saved on behalf of the employee.

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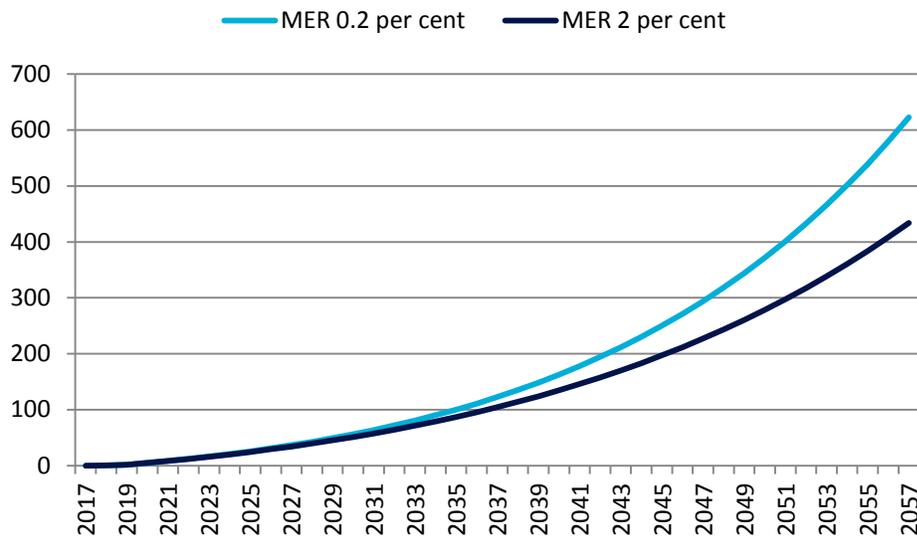
One of the major benefits of a public pension plan is that the management fee associated with public pension plans are substantially lower than the average fee paid by an individual retail investor. One of the most popular investment vehicles for individual savers is mutual funds, as they provide a means to diversify a portfolio even with a relatively small investment account. However, the average management expense ratio on Canadian mutual funds is about 2 per cent. Mutual funds are especially expensive compared with publicly managed pension funds. For example, the CPP Investment Fund, which the ORPP will replicate, reports investment costs under 0.2 per cent.

Consider someone who makes \$60,000 a year and starting in 2017, saves an annual amount equivalent to the ORPP contributions for 40 years. We can calculate the difference in asset accumulation resulting from alternative management fee structures, first under the fee structure of the public plan and second, the fee structure available to a typical retail investor. Assuming a nominal rate of return of 6 per cent and 0.2 per cent management fees, the ORPP contributions would grow to \$622,776 in 2057 when invested in a public pension plan.²⁷ (See Chart 11). Alternatively, we assume that the individual purchases mutual funds that match the rate of return in the publicly managed pension fund and that instead of putting contributions in the ORPP, that money is invested privately incurring a 2 per cent management fee. By changing only the management fees incurred on the portfolio, the investments would grow to just \$434,056. In this scenario, when the savings are invested in the ORPP—therefore benefiting from lower management expenses—the value of the investment is 43 per cent higher. This illustrates just how important management fees are in asset accumulation, especially over a multi-decade period. One of the most valuable features of the ORPP is that it allows individuals to access the expertise of professional portfolio managers at a very low cost.

²⁷ This includes both the employee and employer contributions.

Chart 11

Asset Accumulation Under Different MER Assumptions*
(thousands \$)



* Nominal return assumption of 6 per cent, returns calculated net of management fees
Source: The Conference Board of Canada.

The other major advantage of a public defined benefit pension plan is the ability to transfer risk. Our representative individual discussed above and every other person who joins the ORPP will benefit from the ability to mitigate the common risks associated with saving for retirement: longevity risk (the risk that you outlive your accumulated wealth), inflation risk (the risk that wealth will be destroyed by unexpectedly high price growth), and investment risk (risk from financial market fluctuations). By design, the ORPP will pay a guaranteed inflation-indexed benefit for life to its members and, as a result, these individuals will now have a stream of retirement income that is insulated from the risks they faced when assuming full responsibility for their retirement finances.

Members of the ORPP will experience a positive income boost from the ORPP. However, many will adjust down their own savings, lowering their retirement investment income, while others will face reduced GIS and OAS payments. Regardless, total retirement income is higher in the scenario that includes the ORPP. Furthermore, individuals currently without a pension plan will be able to transfer a portion of their retirement savings risk to the government while also benefiting from much lower investment management fees.

6.2 Case Studies

6.2.1 High-Income Individual

Individual A begins contributing to the ORPP in 2020 at age 25. His annual income is \$90,000 and he contributes \$1,644 to the ORPP when he first enrolls in 2020. Individual A's income is assumed to grow in line with average wages in the economy until he retires at 65 in 2060. By 2059, Individual A's annual nominal income is \$273,214.

In his first year of retirement, Individual A would qualify for the maximum CPP benefit of \$43,975 as well as an OAS benefit of \$16,747, replacing 22.2 per cent of his 2059 income. The ORPP would then provide an additional benefit of \$38,095, increasing Individual A's total government income replacement to 36.2 per cent.

By the time Individual A retires, he will have contributed a total of \$73,204 to the ORPP in 2015 inflation-adjusted dollars. If he lives until 85 (in line with current life expectancy at age 65), he could expect to collect total ORPP benefits of \$297,210 (in 2015 inflation-adjusted dollars).

6.2.2 Medium-Income Individual

Individual B begins contributing to the ORPP in 2017 at age 25. She contributes \$1,074 in her first year in the plan, at which point her annual income is \$60,000. This \$60,000 figure is again assumed to grow in line with average wages and Individual B's annual income will reach \$182,143 the year before she retires in 2060.

Individual B would qualify for a CPP benefit of \$42,911, as well as an OAS benefit of \$17,533 upon her retirement in 2060. Total income from these sources amounts to 33.2 per cent of her 2059 earnings. The ORPP would increase Individual B's retirement income by \$24,709, bringing her total government income replacement rate to 46.8 per cent.

Individual B will have contributed a total of \$54,044 to the ORPP (in 2015 inflation-adjusted dollars) upon her retirement. If she lives until 85, she could expect to collect total ORPP benefits of \$192,774 (in 2015 inflation-adjusted dollars).

6.2.3 Low-Income Individual

Individual C also begins contributing to the ORPP in 2020 at age 25. His annual income is \$20,000 and he contributes \$335 to the ORPP when he first enrolls in 2020. The \$20,000 figure is again assumed to grow in line with average wages to reach \$60,714 the year before Individual C retires in 2060.

Upon retirement, Individual C would qualify for a CPP benefit of \$14,085 and an OAS benefit of \$17,533. Because Individual C earns sufficiently low income, he also receives a GIS benefit of \$13,704. This figure is the net of the maximum GIS income—equal to \$23,774 in 2060—and a partial claw back of \$10,700 since Individual C's retirement earnings fall into the range where GIS benefits are scaled back.²⁸ Of the \$10,700 in GIS claw back, \$3,657 is the result of higher ORPP benefits. The CPP, OAS, and GIS benefits sum to \$44,692, for a 73.6 per cent replacement of his 2059 earnings. The ORPP would also provide a benefit of \$7,314; thus, Individual C's total government income replacement would be equal to 85.7 per cent in his first year of retirement.

By the time Individual C retires, he will have contributed a total of \$16,717 (in 2015 inflation-adjusted dollars). If he lives until 85, he could expect to collect total ORPP benefits of \$57,066 (in 2015 inflation-adjusted dollars).

7. Research Summary

This report highlights many of the benefits that will accrue to individuals from the implementation of the ORPP. At a time when workplace pension plans are declining, we find that the ORPP can be a cost-effective way to increase savings and allow Ontarians to better prepare for retirement. The ORPP will benefit plan members through lower average financial management costs, the sharing of market risk, and lessening the risk of outliving one's savings.

Estimating the long-term impact of the ORPP is complex and requires careful modelling of a number of reactions. In this analysis, the economic impacts considered include the size of ORPP contributions and benefits, the change in personal savings in response to the ORPP, changes from employers in terms of

²⁸ Individuals A and B do not receive GIS benefits because their retirement earnings were sufficiently high for the annual GIS maximum to be entirely clawed back.

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how fast they will pass the increased costs of the ORPP down to employees, changes in government social security programs to reflect the potential for reduced OAS/GIS payments, and the response of investment to an increase in domestic savings.

Our analysis suggests that the increase in mandatory ORPP savings results in a period of lower real household disposable income and a drop in real consumer spending over the short and medium term compared with the base case. The impact of declining real household spending on real GDP is mitigated by a reduction in personal RRSP savings and other macroeconomic developments in the economy. Specifically, net exports increase over the medium term due to higher export demand linked to a modestly weaker Canadian dollar, and spending on imports is lower as a result of softer domestic demand and increased import prices. Investment spending weakens as a result of lower domestic demand, offsetting the impact of higher capital spending in response to the increase in savings.

Employment is lower and the unemployment rate higher due to the modestly weaker economy over the medium term. The impact is primarily confined to business services such as wholesale, retail, and financial services, which are dependent on consumer spending. Manufacturing activity improves over the first half of the forecast period due to rising exports.

Our analysis also shows that while the ORPP will have a small negative impact on the Ontario economy in the short term, the federal EI contribution rate reduction scheduled for 2017 and the reduction to the Ontario WSIB premiums set to take place during the 2017–32 period will have a positive impact on the Ontario economy and therefore partially mitigate the short term impact of the ORPP.

Over the long term, the impact of the ORPP has a positive impact on Ontario's economy. Real GDP starts to rise above the base scenario in 2038 as pension benefit payments increase. While the net impact on real household spending is negative for almost 25 years, real spending eventually increases above the base scenario as retiring members of the ORPP start to spend their higher incomes. Stronger household spending helps boost investment and increases Canada's capital stock, offsetting losses observed over the first half of the simulation. Using a social discount rate of 3 per cent, the ORPP has an NPV impact on disposable income of \$28 billion and an NPV impact on GDP worth \$39.7 billion. Therefore, after accounting for price movements, opportunity cost, and time preferences, consumers and the economy as a whole are better off under the ORPP.

Appendix A: Summary Tables

Economic Impact of the ORPP

(difference from base scenario; level difference in 2007 \$ millions unless otherwise stated; per cent difference in italics)

Key Components of Aggregate Demand (2007 \$ millions)	2017	2020	2025	2030	2040	2050	2060	2070	2080	2093
Final consumption expenditure	-29	-465	-3,247	-1,906	260	4,052	9,518	13,136	17,263	24,333
<i>per cent</i>	<i>-0.01</i>	<i>-0.08</i>	<i>-0.52</i>	<i>-0.28</i>	<i>0.03</i>	<i>0.41</i>	<i>0.80</i>	<i>0.92</i>	<i>1.01</i>	<i>1.12</i>
Household consumption expenditure	-24	-375	-2,836	-1,784	191	3,592	8,479	11,714	15,400	21,890
<i>per cent</i>	<i>-0.01</i>	<i>-0.09</i>	<i>-0.61</i>	<i>-0.35</i>	<i>0.03</i>	<i>0.49</i>	<i>0.98</i>	<i>1.13</i>	<i>1.24</i>	<i>1.39</i>
Investment	-7	-247	-884	-303	125	940	2,100	2,899	3,828	5,109
<i>per cent</i>	<i>-0.01</i>	<i>-0.17</i>	<i>-0.55</i>	<i>-0.17</i>	<i>0.06</i>	<i>0.36</i>	<i>0.68</i>	<i>0.79</i>	<i>0.88</i>	<i>0.94</i>
Exports of goods and services	0	43	1,259	1,567	278	-1,159	-2,492	-2,560	-1,437	1,085
<i>per cent</i>	<i>0.00</i>	<i>0.01</i>	<i>0.27</i>	<i>0.30</i>	<i>0.04</i>	<i>-0.14</i>	<i>-0.25</i>	<i>-0.21</i>	<i>-0.09</i>	<i>0.06</i>
Less: imports of goods and services	-13	-258	-1,135	-269	324	1,939	4,937	7,766	12,198	20,986
<i>per cent</i>	<i>0.00</i>	<i>-0.06</i>	<i>-0.25</i>	<i>-0.05</i>	<i>0.05</i>	<i>0.24</i>	<i>0.49</i>	<i>0.64</i>	<i>0.82</i>	<i>1.09</i>
Gross domestic product at market prices*	-22	-415	-1,752	-377	343	1,911	4,227	5,761	7,523	9,627
<i>per cent</i>	<i>0.00</i>	<i>-0.06</i>	<i>-0.22</i>	<i>-0.04</i>	<i>0.03</i>	<i>0.15</i>	<i>0.28</i>	<i>0.32</i>	<i>0.34</i>	<i>0.35</i>
Other Key Economic Indicators										
Consumer Price Index (<i>per cent</i>)	<i>0.00</i>	<i>-0.01</i>	<i>-0.16</i>	<i>-0.18</i>	<i>-0.15</i>	<i>-0.07</i>	<i>0.03</i>	<i>0.11</i>	<i>0.14</i>	<i>0.12</i>
Exchange rate (U.S./Can.; <i>per cent</i>)	<i>0.00</i>	<i>0.05</i>	<i>0.39</i>	<i>-0.06</i>	<i>-0.10</i>	<i>-0.14</i>	<i>-0.15</i>	<i>-0.05</i>	<i>0.02</i>	<i>0.10</i>
Unemployment rate (percentage point difference)	0.00	0.08	0.08	-0.03	-0.05	-0.09	-0.12	-0.10	-0.08	-0.06
Employment (000s)	-0.4	-8.6	-17.5	-3.0	3.3	14.9	29.2	35.7	42.2	47.8
<i>per cent</i>	<i>-0.01</i>	<i>-0.12</i>	<i>-0.23</i>	<i>-0.04</i>	<i>0.04</i>	<i>0.17</i>	<i>0.30</i>	<i>0.35</i>	<i>0.38</i>	<i>0.40</i>
Real disposable income (2007 \$ millions)	-70	-2,857	-4,339	-3,380	-1,567	1,779	6,635	9,498	12,981	19,373
<i>per cent</i>	<i>-0.02</i>	<i>-0.64</i>	<i>-0.90</i>	<i>-0.64</i>	<i>-0.25</i>	<i>0.23</i>	<i>0.73</i>	<i>0.88</i>	<i>1.00</i>	<i>1.18</i>
Bank rate (percentage point difference)	0.00	-0.02	-0.20	0.01	0.03	0.06	0.07	0.04	0.01	-0.03
Assumptions										
ORPP contributions (\$ millions)	127	5,157	6,625	7,869	11,444	16,747	24,093	34,839	50,547	81,240
ORPP benefits (\$ millions)	0	0	470	1,693	7,210	18,407	38,080	60,851	94,259	164,085
Reduction in RRSP savings (\$ millions)	-26	-1,181	-2,004	-2,337	-3,373	-4,872	-6,906	-9,929	-14,357	-23,101

Source: The Conference Board of Canada.

*totals are created using fisher aggregates

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Economic Impact of the ORPP Including Reduced EI and WSIB Premiums

(difference from base scenario; level difference in \$ 2007 millions unless otherwise stated; per cent difference in italics)

Key Components of Aggregate Demand (2007 \$ millions)	2017	2020	2025	2030	2040	2050	2060	2070	2080	2093
Final consumption expenditure	410	625	-1,820	-553	1,711	5,389	10,734	14,230	18,232	25,158
<i>per cent</i>	<i>0.07</i>	<i>0.11</i>	<i>-0.29</i>	<i>-0.08</i>	<i>0.21</i>	<i>0.54</i>	<i>0.90</i>	<i>1.00</i>	<i>1.07</i>	<i>1.16</i>
Household consumption expenditure	337	539	-1,566	-581	1,457	4,728	9,485	12,590	16,153	22,515
<i>per cent</i>	<i>0.08</i>	<i>0.13</i>	<i>-0.34</i>	<i>-0.12</i>	<i>0.24</i>	<i>0.65</i>	<i>1.09</i>	<i>1.21</i>	<i>1.30</i>	<i>1.42</i>
Investment	108	92	-570	-21	462	1,281	2,442	3,242	4,173	5,430
<i>per cent</i>	<i>0.08</i>	<i>0.06</i>	<i>-0.35</i>	<i>-0.01</i>	<i>0.21</i>	<i>0.49</i>	<i>0.79</i>	<i>0.89</i>	<i>0.96</i>	<i>1.00</i>
Exports of goods and services	-2	-162	532	933	-137	-1,212	-2,176	-1,862	-360	2,604
<i>per cent</i>	<i>0.00</i>	<i>-0.04</i>	<i>0.11</i>	<i>0.18</i>	<i>-0.02</i>	<i>-0.15</i>	<i>-0.21</i>	<i>-0.15</i>	<i>-0.02</i>	<i>0.13</i>
Less: imports of goods and services	198	206	-731	152	942	2,721	5,903	8,948	13,628	22,762
<i>per cent</i>	<i>0.05</i>	<i>0.05</i>	<i>-0.16</i>	<i>0.03</i>	<i>0.14</i>	<i>0.33</i>	<i>0.59</i>	<i>0.73</i>	<i>0.92</i>	<i>1.18</i>
Gross domestic product at market prices*	321	352	-1,138	209	1,104	2,761	5,143	6,722	8,492	10,523
<i>per cent</i>	<i>0.05</i>	<i>0.05</i>	<i>-0.14</i>	<i>0.02</i>	<i>0.10</i>	<i>0.22</i>	<i>0.34</i>	<i>0.37</i>	<i>0.39</i>	<i>0.38</i>
Other Key Economic Indicators										
Consumer Price Index (<i>per cent</i>)	<i>0.00</i>	<i>0.03</i>	<i>-0.07</i>	<i>-0.09</i>	<i>-0.04</i>	<i>0.04</i>	<i>0.14</i>	<i>0.21</i>	<i>0.23</i>	<i>0.17</i>
Exchange rate (U.S./Can.; <i>per cent</i>)	<i>-0.01</i>	<i>-0.09</i>	<i>0.30</i>	<i>-0.04</i>	<i>-0.09</i>	<i>-0.11</i>	<i>-0.11</i>	<i>-0.01</i>	<i>0.06</i>	<i>0.15</i>
Unemployment rate (percentage point difference)	-0.04	0.02	0.07	-0.04	-0.06	-0.10	-0.12	-0.10	-0.08	-0.05
Employment (000s)	3.1	-0.7	-11.8	1.9	9.2	21.0	34.9	41.1	47.1	51.7
<i>per cent</i>	<i>0.04</i>	<i>-0.01</i>	<i>-0.15</i>	<i>0.02</i>	<i>0.11</i>	<i>0.23</i>	<i>0.36</i>	<i>0.40</i>	<i>0.43</i>	<i>0.43</i>
Real disposable income (2007 \$ millions)	1,158	-1,993	-3,086	-2,098	-242	2,990	7,720	10,453	13,810	20,076
<i>per cent</i>	<i>0.27</i>	<i>-0.45</i>	<i>-0.64</i>	<i>-0.40</i>	<i>-0.04</i>	<i>0.39</i>	<i>0.85</i>	<i>0.97</i>	<i>1.06</i>	<i>1.22</i>
Bank rate (percentage point difference)	0.00	0.04	-0.15	0.01	0.03	0.06	0.07	0.03	0.00	-0.04
Assumptions										
ORPP contributions (\$ millions)	127	5,157	6,625	7,869	11,444	16,747	24,093	34,839	50,547	81,240
ORPP benefits (\$ millions)	0	0	470	1,693	7,210	18,407	38,080	60,851	94,259	164,085
Reduction in RRSP savings (\$ millions)	-18	-1,162	-1,986	-2,318	-3,342	-4,829	-6,850	-9,860	-14,276	-23,022

Source: The Conference Board of Canada.

*totals are created using fisher aggregates

Appendix B: Detailed Methodology for Estimating Potential Output

Over the longer term, this analysis relies on the concept of potential output. Potential output is the key component of a long-term forecast, as it measures the highest level of economic activity an economy can reach without surpassing its capacity limits and igniting inflation. Potential output determines how fast an economy can grow when all factors of production—namely labour and capital—are employed at maximum efficiency. In essence, it is simply a function of the available labour force, the level of fixed capital, and the overall technical efficiency (measured as total factor productivity [TFP]) in which capital and labour are transformed into output.

Potential output cannot be directly measured and, therefore, must be estimated. While there are a number of methods that can be used to derive potential output, the Conference Board uses a structural production function that assumes a Cobb-Douglas form where output (Y) is calculated as:

$$Y = [L^\alpha][K^{(1-\alpha)}][TFP]$$

and is a function of labour (L), capital (K), labour's share of income (α), and technical efficiency (TFP). Under this assumption, the two factors of production are capital and labour, and TFP measures the efficiency with which the two factors of production are used to produce output. While the above aggregate production function can be used to explain output over history, potential output is defined as the level of economic activity associated with the full and efficient use of the factors of production. As such, the production function can be redefined, in logarithmic form, as:

$$\log(YPOT) = \alpha * \log(LPOT) + (1 - \alpha) * \log(K) + \log(TTFP)$$

Here, potential output (YPOT) is a function of fully used employment or potential employment (LPOT), the actual capital stock (K), and trend total factor productivity (TTFP). In order to estimate this equation, we need estimates for potential employment, capital, and trend TFP.

Potential Employment

Like potential output, potential employment cannot be measured directly but must be estimated as the contribution from the available workforce when the economy is operating at capacity. While the ORPP is expected to result in a small change in population over the simulation, the change is not large enough to impact Ontario's potential employment. When the economy is operating at capacity, the labour force

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participation rate is at its structural peak and unemployment is at its “natural rate.” Therefore, movements in the structural participation rate and the natural rate of unemployment are the two main factors driving changes in labour’s contribution to output over the long term. The natural rate of unemployment defines a minimum level of unemployment that would always remain as there are always some people in transition between jobs and others who prefer not to work at the current wage.

Over the forecast, population aging will have a significant impact on potential employment in Ontario. In 2014, 15.6 per cent of Ontario’s population was 65 and over and that share will climb steadily until 2065 when it reaches 27 per cent. Over the remainder of the forecast, this share is expected to hold relatively steady.²⁹ As is the case across Canada, population aging in Ontario is being driven by the aging of the large cohort of baby boomers and as this cohort gradually exits the workforce, we will see a decline in both the natural rate of unemployment and the labour force participation rate. As the population ages, unemployment resulting from workers in transition will decline, as older employees are less likely to quit their jobs to look for other work. Thus, the natural rate of unemployment is expected to trend slowly downward over the forecast period—from 5.9 per cent in 2014 to 5.5 per cent in 2035—positively contributing to potential employment.

While the aging of the population will lower the natural unemployment rate, it will also result in a sharp drop in the labour force participation rate as a significant share of baby boomers move into their retirement years. The participation rate is forecast to fall from 66 per cent in 2014 to 59 per cent in 2054 and remain at that level throughout the rest of the forecast. Population aging will also negatively impact average hours worked as older workers tend to work fewer hours as they are increasingly likely to opt for part-time work as they get older. The increase in the labour force share of these older groups will reduce average hours worked over the first 15 years of the forecast, after which they remain flat over the remainder of the forecast period.

On balance, the negative effects of declining participation rates and a drop in average hours worked will outweigh the benefits derived from a lower natural rate of unemployment, resulting in a steady decline in labour’s contribution to potential output over the long term. After averaging 0.4 percentage points from 2010 to 2019, labour’s annual contribution to potential output growth will decline to an average of

²⁹ The population assumptions used in this analysis were provided by the Ontario Ministry of Finance.

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0.2 percentage points over 2020 to 2029. Over the last 60 years of the forecast, labour's contribution to potential will tick up to 0.4 percentage points, as growth in the source population is expected to accelerate slightly over the last half of the forecast.

Capital

The value of productive capital is the second factor of production required to calculate potential output. Instead of relying on a measure of potential or optimal capital stock, the Conference Board assumes that productive capital is accurately measured and that the level of capital in the economy at any time is all that is available to contribute to potential output. Total public and private capital, excluding residential assets, contributes to the level of productive capital. While some studies ignore public capital in assessing potential, the Conference Board assumes that public infrastructure contributes to the productive capacity of the private sector.³⁰ Excluding the public capital stock would create an upward bias on the private sector's contribution to economic and productivity growth. The Conference Board's estimates of capital stock are based on Statistics Canada's Fixed Capital Flows and Stocks geometric depreciation and seed values. In the forecast, the capital stocks are built using projected investment flows.

Over the long term, tight labour markets will place upward pressure on wages, which will, in turn, act as an incentive for firms to replace labour with machinery and equipment where possible. In addition to more investment, higher capacity utilization and strong corporate profits will help keep capital stock elevated over the long term. From 2020 to 2093, capital's contribution to potential output is expected to average 0.9 percentage points per year.

Total Factor Productivity

The technical efficiency with which capital and labour are used to produce output is measured by total factor productivity. Over history, TFP is calculated residually, using the logarithmic form of the Cobb-Douglas production function so that changes in output not explained by labour or capital are attributed

³⁰ A recent Canadian study has in fact shown that public capital stock has played a large role in historical productivity growth in the business sector. See Wulong Gu and Ryan Macdonald, *The Impact of Public Infrastructure on Canadian Multifactor Productivity Estimates* (Ottawa: Statistics Canada, January 2009). Catalogue no. 15-206-X, no. 21. www.statcan.gc.ca/pub/15-206-x/15-206-x2008021-eng.pdf (accessed November 3, 2015).

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to changes in technical efficiency. In this calculation, total output is defined as real output at basic prices for all industries, excluding paid and imputed rent. Paid and imputed rents are excluded because the Conference Board's estimates of the capital stock do not take into account residential assets since these do not contribute to the productive capacity of the economy. TFP fluctuates considerably over the business cycle. The reasons for this are wide ranging but include changes in the mix between capital and labour, relative shifts in the types of capital purchased, shifts in labour productivity as skills evolve, and tax changes. In order to remove the effects of volatile short-term movements, potential output is calculated with trend TFP, which is our residual measure smoothed with a Hodrick-Prescott filter.

Over much of the last decade, trend TFP growth has slowed significantly. However, we expect TFP to improve over the next few years and then grow by 0.6 per cent annually, slightly below its long-term average. With the growth in the number of workers dwindling, firms will need to continually invest in productivity-enhancing technology and the skills development of their workforce in order to maintain robust growth in TFP. However, it will be difficult to maintain the growth rates in TFP recorded over the past two decades, as the surge in productivity growth linked to the high-technology revolution in the late 1990s and early 2000s starts to wane over the long term.