

Appendix A The impact of high taxes on the growth of productivity

Canada maintains a relatively high tax burden compared to our major trading partners and our public debt load is at an unsustainable level (see tables 1 and 2). As Table A1 illustrates, Canadians face the highest income and profit taxes as a percentage of GDP and relatively high property taxes. Canada's social-security tax, however, is comparatively low. On this basis, some defenders of the status quo argue that Canada has room to raise social-security taxes (payroll taxes). However, Canada's population is comparatively younger, resulting in lower social-security taxes. Moreover, as the OECD report states:

Although payroll taxes are low compared with other OECD countries, the same is not the case for total taxes payable on labour, including both income tax and

social security contributions. The average effective tax rate on labour income in Canada is in fact 29 percent, which is higher than all except the continental European OECD members (OECD 1997: 82)

It is quite evident that Canada's tax burden is considerably higher than our major trading partner, the United States. Over the last quarter century, the cost of transportation and communication has declined drastically. In addition, there is a relatively freer trading environment. In this environment, capital and, to a lesser extent, labour is mobile (Reich 1992). Given that investors are interested in their after-tax rate of return, a competitive tax regime is a necessary condition for attracting investment dollars. In turn, investment is necessary if we are to have higher levels of productivity growth.

Table A1: International Tax Comparisons (1996)

	Total Tax as Percent of GDP	Specific Taxes as a Percent of Total Taxes				
		Income & Profits	Social Security	Property	Goods & Services	Other
United States	28.5%	47.2%	24.7%	11.0%	17.2%	0.0%
Japan	28.4%	36.6%	36.5%	11.3%	15.4%	0.2%
United Kingdom	36.0%	36.8%	17.3%	10.6%	35.2%	0.1%
Canada	36.8%	47.3%	16.3%	10.4%	24.9%	1.1%
OECD average	37.7%	35.3%	25.1%	5.4%	32.5%	1.7%
Germany	38.1%	28.4%	40.6%	3.0%	27.9%	0.1%
Italy	43.2%	34.4%	34.2%	5.4%	25.9%	0.1%
France	45.7%	18.0%	43.1%	5.1%	27.3%	6.5%
Sweden	52.0%	41.0%	29.8%	3.8%	22.8%	2.6%

Source: OECD, Revenue Statistics, 1965–1977, 1998. Taken from Emes and Walker 1999.

Table A2: Net Government Debt as a Percentage of GDP, 1998 (estimate)

Country	Percent
Sweden	19.7%
Japan	26.9%
United Kingdom	42.7%
France	44.8%
United States	45.5%
Germany	50.2%
Canada	60.0%
Italy	106.2%

Source: *OECD Economic Outlook 63*; taken from Emes and Walker 1999.

Theory and empirical evidence on taxation

Economic theory suggests that by modifying the costs and benefits of a particular activity, taxes can alter the incentives faced by individuals and businesses and encourage outcomes that are less likely to have transpired in the absence of taxation (Gwartney and Stroup 1993; Aaron and Pechman 1981; see Law and Mihlar 1996: 16–20). For instance, payroll taxes impose increases in the price of labour and as a consequence persuade businesses to substitute capital for human resources (OECD 1994). High marginal tax rates on income deprive individuals of their right to enjoy the fruits of their own labour and discourage them from working hard (Heckman 1993; Triest 1990). Taxation on capital gains tends to reduce the rate of aggregate savings and investment (Summers 1984; Ture and Sanden 1977). In short, high taxes diminish the incentive to work harder, places a significant drag on economic growth and the ability to increase the standard of living.

Evidence from around the world increasingly shows that jurisdictions that maintain low levels of taxation are those that are best positioned to experience strong economic growth (Gwartney and Lawson 1998). In a study by the

World Bank on the effects of taxation, jurisdictions with lower tax rates grew faster than those with relatively higher tax rates (Marsden 1983).

Another study estimated that increasing a country's taxes by 10 percent has the effect of reducing its GDP growth by almost 2 percent (King and Rebelo 1990). Likewise, Easterly and Rebelo found that there was a strong negative relationship between the rate of economic growth and tax revenue (Easterly and Rebelo 1993). High taxes, it would appear, impede productivity growth and, consequently, economic growth.

Theory and evidence suggest that high taxes have a distortionary effect on the economy. Professor Bev Dahlby has noted that, for each additional tax dollar collected through personal income taxes, the Canadian economy is deprived of \$1.38 in economic output (Dahlby 1994). Moreover, a study completed by De Matteo and Shannon (1995) on the effects of payroll taxes in Canada concluded that a 1 percent increase in average payroll taxes results in an increase of employers' real wage costs by 0.56 percent, a decrease in real wages of 0.55 percent, and a reduction in employment of 0.32 percent (De Matteo and Shannon 1995). This study is supported by another research paper conducted by the Bank of Canada, which found that increasing payroll taxes from 10.6 percent of wages and salaries in 1991 to 14.1 percent in 1994 may have directly led to a reduction in employment levels in Canada by about 1 percent in 1994 (Parker 1995).



In sum, high tax rates diminish incentives, impede economic growth, and lead to a lower standard of living (see Frankel 1998). Conversely, lower levels of taxation encourage firms and individuals to invest in more human and physical capital, lead to greater innovation, higher levels of productivity, and increases in disposable income.

Productivity refers to the efficiency with which industry combines capital, labour, and other factors of production to produce a given level of output. As is evident from table A3, Canada has experienced a substantial slowdown in productivity growth since the 1970s and this, in turn, has led to slower growth in real income.

Table A3: Comparative Total Factor Productivity Growth for Selected OECD Countries (Annual Average)

	Canada	United States	Japan	Germany	France	Italy	United Kingdom	Australia
1980-1990	-0.4	0.8	1.7	1.3	1.7	1.2	1.8	0.7
1990-1996	-0.4	0.5	0.5	-0.1	0.8	1.3	0.9	1.6

Note: For Italy, the United Kingdom, and Australia, the end date is 1995; for Germany, 1993.
Source: OECD 1998: 44-45.



Appendix B Changes to the Canada Pension Plan

This appendix is provided to present an overview of the changes proposed to the Canada Pension Plan (CPP) in 1997 and implemented in 1998. The changes to the CPP have created a “savings” of 4 per cent for future contributors, reducing the maximum expected contribution rate from 13.9 percent to 9.9 percent.

As with any pension, the reform possibilities were limited to three areas: revenues, expenses (benefits), and fund management. The new plan includes changes to all three areas: increases to the contribution rate, adjustments to some of the benefits, and changes in the investment policy. The main benefits of the plan and the eligibility criteria have not been changed. For instance, although life expectancy has increased from roughly 69 years since the inception of the CPP to 76 years in 1990 and is expected to further increase to nearly 81 years by 2020, the age of eligibility has remained constant at 65. Similarly, the target benefit of 25 percent of the average industrial wage remains unaffected.

Contribution rates

Although all three areas of reform will contribute to the savings, it is the acceleration of the increase in the contribution rate that has garnered the lion’s share of public attention. The new plan calls for the contribution rate to increase to 9.9 percent of the average industrial wage (AIW) twelve years of ahead of the previous schedule. The previous agreement called for a rate of 9.9 percent by the year 2015 and a maximum rate of 13.9 percent by 2030. If the accelerated contribution rate were implemented in isolation, that is, if it were the only aspect of the new plan implemented, total savings would be 0.5 percent rather than 4 percent.

Investment policy

The new plan also changes the investment policy from passive investment in provincial bonds to a more pro-active strategy that includes stocks, higher-yielding government and corporate bonds, and some foreign investments. The new CPP Investment Board will thus invest the contributions of individuals like any private pension or mutual fund. If the new plan only included changes in the investment policy, the savings would be 0.3 percent.

Coupling the accelerated increase in the contribution rate with the new investment policy is expected to yield greater savings. The combined effect is projected to yield savings of 1.5 percent, almost double the rate of savings expected if the reforms had been introduced in isolation. The reason the savings are increased when the two changes are implemented in concert relates to their complementary nature. By mandating greater deductions sooner, and at the same time investing the funds in a more proactive manner, the CPP is able to amplify the total earnings of the fund and thus generate a greater level of overall savings.

Freezing the years’ basic exemption

The change that has the single largest impact has also received the least public attention. Freezing the Years’ Basic Exemption (YBE) is responsible for 35 percent of the total savings. Under the previous plan no one had to pay CPP premiums on the first \$3,500 of income: an individual who earned \$40,000 in 1996, for example, would have paid CPP premiums only on the amount above the YBE (\$3,500) and below the Years’ Maximum Pensionable Earnings (YMPE) of \$35,400.

The aim of the exemption was to exclude individuals whose earnings were deemed minimal from having to bear the cost of CPP deductions. Under the old plan, the YBE and the YMPE were adjusted each year in order to reflect changes in the level of average wages. The new plan freezes the level of the exemption at its current level of \$3,500. This change will effectively decrease the value of the exemption at the rate at which industrial wages increase. The September 1997 actuarial report on the proposed reforms described this change as follows:

Freezing the YBE is expected to reduce the stable contribution rate by 1.4 percentage points but does not materially affect the amount of contributions as it produces a gradual compensatory increase in the contributory base. (Office of the Superintendent of Financial Institutions 1997: 5)

The meaning of this is simple: more people will be included in the pool of individuals who contribute to the CPP. The change to the Year's Basic Exemption generates 1.4 percent of the total 4.0 percent in savings to the CPP.

Changes to benefits and eligibility

There were many marginal changes to the benefits available under the CPP. Six areas have been reformed: eligibility requirements for disability benefits, administration of disability benefits, conversion calculation from disability to retirement benefits, limitations on combined pensions, limits on the death benefit, and the calculation of the earnings index. In all, these changes generate 1.1 percent of the total 4 percent savings.

Eligibility requirements for disability benefits

Under the previous plan, individuals must have contributed for at least two of the last three years, or five of the last ten years before applying for disability benefits. Under the revised plan, employment earnings are not permitted to drop below ten percent of the AIW for four of the last six years. This change is expected to reduce the aggregate level of disability benefits by 6.5 percent by 2030.

Administration of disability benefits

The guidelines for the determination of disabilities were further revised in order to focus more explicitly on medical conditions as opposed to socio-economic factors. The administrative changes in determining eligibility are expected to reduce the level of disability benefits otherwise projected for 2030 by 9.4 percent.

Conversion calculation from disability to retirement benefits

The calculation used to convert disability benefits into retirement pension benefits was also changed under the reforms. Under the previous plan, the conversion rate was based on the increase in wages between the time of disability and retirement. Under the reforms, the calculation will now be made based on the wage of the individual at the time of the start of disability benefits and adjusted for price increases. The change is expected to reduce the aggregate level of retirement benefits by 1.6 percent by 2030.

Limitations on combined pensions

The limits for combined survivor-retirement pensions and combined survivor-disability pensions will be reduced in respect to any of the two components of a combined pension after 1997 to levels comparable to those applied in 1986. The reversion of combined benefit limitations to a 1986 level is expected to reduce the value of combined benefits by 12.1 percent by 2030.

Limits on the death benefit

The limit on the death benefit (previously calculated as a lump sum payment equal to 6 months of retirement benefits) will be reduced from 10 percent of the YMPE (\$3,580 in 1997) to a constant \$2,500. This change is expected to reduce the aggregate death benefits by 77.2 percent otherwise projected for 2030.

Calculation of the earnings index

The earnings index used to calculate the individual's pensionable benefits will be extended from the most recent 3 years of earnings to the last 5 years of earnings. The modification is expected to reduce the aggregate level of retirement, survivor, and disability benefits projected for 2030 by 3.7 percent.

Effect of the changes

The three major changes to the CPP—the acceleration in the increase in contribution rates, the change in the investment policy, and the freezing of the basic exemption—coupled with the six benefit and eligibility requirements combine to reduce the maximum expected contribution rate from 13.9 percent to 9.9 percent. It seems evident from the range of changes made and the scope of particular changes (e.g., the alteration in the investment policies), that there is little room left to make cosmetic changes to the CPP.



Appendix C Derivatives and index funds

Derivatives

A derivative is a financial instrument that derives its value, in whole or in part, from some underlying asset. It is essentially a contract whose returns are linked to the price movements of an underlying asset, such as a commodity, a share in a public company, an interest rate, or a currency.

The critical distinction between the derivative and the underlying asset is that the derivative is an intangible asset whose value is derived indirectly while the underlying asset has tangible, inherent value. For example, the difference between derivatives on securities and the securities themselves is that shares are assets, “physical pieces” of a company, while derivatives are contracts based on the securities.

Derivatives enable investors to control foreign assets without actually owning the asset. For example, an investor who purchases certain types of derivatives to mirror the Dow Jones Industrial Average or the Standard & Poor 500 Index can effectively match the return performance of the underlying asset without actually owning the asset.

It is important to note, however, that the use of derivatives is extremely complex and based on a host of sophisticated mathematical formulations.

Types of Derivatives

There are many types of assets that are classified as derivatives. The unifying concept used in classifying derivatives is that all these instruments are contracts that derive their value either in part or in whole from the underlying asset on which they are based. Some examples of the more common derivatives are set out below.

Exchange Traded Options

Options that trade on major stock exchanges, like the Chicago Board Options Exchange, are regulated and standardized.

These are called “exchange traded options.” Individuals can purchase these options on, for example, specific stocks much as they would purchase the stocks themselves.

An option contract gives the purchaser the right but not the obligation to buy or sell a certain quantity of a specific asset (e.g., security, currency, debt instrument, commodity, or stock index) at a predetermined price, called the strike or exercise price.

The price at which the option contract trades is called the premium. It is paid by the purchaser to the seller (writer) of the option. The option seller retains the premium whether or not the option is exercised.

A call option gives the owner the right (not the obligation) to buy an asset. Alternatively, a put option gives the purchaser the right (not the obligation) to sell an asset. The purchase or sale of the asset occurs either on a specific future date (European option) or by a certain date in the future (American option).

An option holder (buyer) is not obligated to exercise the option (sell the asset or take delivery of it). If the option is not exercised or sold by the holder before expiration, the option privilege expires and the contract becomes void.

The potential loss to the buyer of an option can be no greater than the initial premium paid for the option, regardless of how the underlying asset’s price changes. This is what allows the buyer to control the amount of risk assumed. The option writer or seller, in exchange for the premium received from the buyer, assumes the risk of making delivery of the asset if the contract is exercised, where this could lead to significant losses depending how the asset's price has changed.

Similar to stocks, options can be used to take a position on the market in order to make a profit on an upward or downward movement in the market. Buying an option gives the investor the ability to predetermine and therefore limit risk; that is, the “downside risk” is limited, whereas the poten-

tial gain is not (see figures C1 and C2). Writing an option, conversely, exposes the investor to significant downside risk, unless the underlying asset is also owned.

Equity Options

For equity options, one option contract is typically written based on 100 shares of a specific common stock. Unlike stocks, rights, or warrants, equity options are not securities issued by the underlying company. The owner of an equity option owns an agreement giving the right, but not the obligation, to buy or sell shares; more precisely the investor does not own any underlying asset (stock).

Unlike shares, there is no fixed number of equity options outstanding: the number of options in existence depends on the number of writers and buyers of options. An option based on a stock is inherently more risky than the stock itself. That is, while an option mirrors the performance of a stock, the investor owns nothing tangible and can lose the premium, or worse if they “bet” wrong.

The market for writing or buying new options is called the primary market. There is also a secondary options market where previously written options are traded. A central clearing corporation (one each in Canada and the United States) has the function, among other things, of matching all buy and sell orders on the secondary market so that at any time there is a corresponding number of options sold by writers for all options held by buyers. If an option is exercised, commission is payable on the underlying asset by both the option holder and the writer, in addition to the original commission paid by both parties when an option is written.

Buying an equity put option

Refer to figure C2, Buying a Put Option, for this discussion. In February, when ABC company’s common shares traded at \$30,

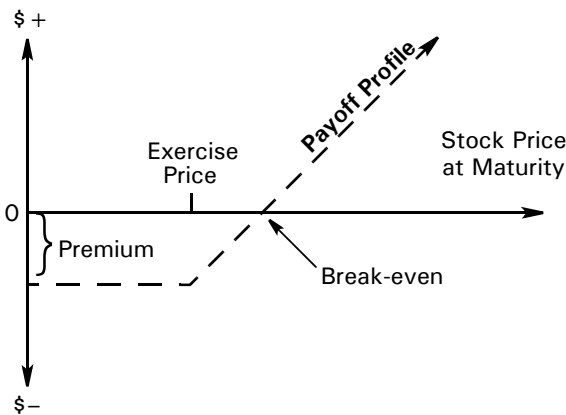
an investor who owned 100 ABC common shares (purchased some time before at \$15 per share) buys one “ABC July 30 put at 2½” (30 is the exercise price of the option and 2½ is the premium). Although this investor views ABC Company as a long-term investment and so does not want to sell the stock right now, they are “bearish” about the stock market over the short-term. That is, they are concerned that the market price of ABC will fall substantially in the short-term. Purchasing one ABC July 30 put (100 common shares of ABC) at 2½, provides the ABC investor with short-term protection against a substantial decline in the value of ABC Company common shares. Purchasing the ABC July 30 put guarantees the investor pre-tax profit of \$12.50 per ABC common share (less applicable commission) until the put expires at a specific date in July.

The guaranteed pre-tax profit is calculated as follows: \$30 (sale price of ABC if the put buyer exercises the ABC put and sells 100 ABC to the put seller) less \$2.50 (the premium cost to buy the ABC put) less \$15 (the original price paid for the ABC common shares) per share (multiply by 100 to get the total value of the put option).

Now assume that, before the ABC July 30 put expires, the market price of ABC falls below \$27.50 as part of a general stock market decline. The ABC investor decides to take the guaranteed pre-tax profit of \$12.50 per share. Note that \$27.50 is the break-even point for this put option whereby the purchaser of the option completely re-coups his costs. If the price of ABC is greater than this, the investor is better off selling the shares on the market as they will bring more than the \$12.50 guaranteed from exercising the option.

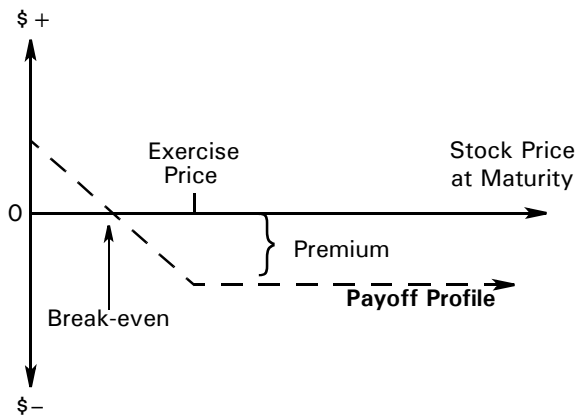
On the other side, since the ABC put buyer decides to exercise the put, the ABC put seller (or writer) has to buy the shares from the put buyer for the agreed \$30, even though the market price of the shares is less than \$30. In this case, the put buyer makes money; the put seller loses money.

Figure C1: Buying a Call Option



Source: Johnson and Pazderka 1995.

Figure C2: Buying a Put Option



In selling the ABC July 30 put, the put writer (seller) hoped the market price of ABC would either increase or remain at the \$30 level, so that it would not be in the put buyer's interest to exercise the put. If the ABC put holder sells the put or lets it expire unexercised, the ABC put writer is not affected and retains the premium (\$250).

The potential loss to the put buyer is no more than the premium (\$250) and the potential gain depends on how far the price of ABC common stock falls. This allows the put buyer to make certain realizing at least a certain price for the stocks and, thus, can be useful insurance when an investor believes the price of ABC common stock will fall.

The value of an options contract is related not just to whether the investor takes delivery of shares or sells them but also to how the market moves. That is, once having bought or written a put, it is valuable on the secondary market, depending on how the price of the underlying asset moves in relation to the exercise price. The further from the expiry date of the option contract, the more valuable the option is because there is a greater length of time for the price of the underlying asset to move favourably. As the expiry date gets closer, the option contract declines in value because there is less uncertainty related to what the market price of the asset will be on the expiry date.

Non-Equity Options

Besides equity options contracts, there are a number of non-equity options such as gold and silver, other commodities, currencies, debt instruments (e.g., T-bills, T-bonds, T-notes, and other bonds), stock indexes, and interest-rate options.

Currency options have an important "hedging" role in reducing currency or foreign exchange risk for exporters and importers. Currency options give Canadian export-oriented corporations and individuals that hold foreign currency denominated assets the opportunity to hedge against foreign currency fluctuations as well as offering speculators the potential for capital gains.

Futures

Futures contracts are the other major type of derivative. Futures contracts can be written on agricultural products, metals, certain foreign currencies, and some financial instruments such as interest rates and stock indices. For example, commodity futures contracts are commitments to deliver or take delivery of a specified quantity and quality of a commodity during a specified future month at an agreed upon price (determined in a commodity exchange).

In commodity futures transactions, no immediate transfer of ownership, or in most cases, delivery of the actual

commodity is involved. In other words, you can buy and sell commodities in a futures market whether or not you own the particular commodity. Most futures contract buyers and sellers close out their contracts (by selling or buying) prior to the delivery month so that physical deliveries are rare.

Participants in the futures market are divided between hedgers and speculators. Hedgers are corporations or individuals who deal in the physical commodities or financial instruments and take on futures contracts to protect their holdings by securing their prices. These investors use the futures market as a form of insurance-with the objective not of making money but of not losing it.

Speculators do not deal in physical commodities. They use their risk capital to try to take advantage of price fluctuations between the futures market and current prices. Unlike hedgers, the goal of speculators is to buy and sell futures contracts in an attempt to make profits. Speculation is inherently a risky enterprise. The fast moving futures markets can result in large losses as well as the opportunity of making a large amount of money.

Forward Contracts

A forward contract obligates the holder to take delivery, and the writer to make delivery, of an underlying asset at a specified price on a future date. A forward contract is identical to a futures contract in that both constitute an obligation to take, or make delivery of an underlying asset at a future date. Technically, a futures contract is equivalent to a forward contract that is settled daily.

Other Derivatives

Other derivatives include: interest rate caps, floors, collars, and swaps. An interest rate cap, places an upper limit on the interest cost to the purchaser of the contract, by formulating a portfolio of (European) call options on the relevant interest rate index, or equivalently, a portfolio of put options on discount bonds. An interest rate floor places a lower limit on the interest rate to be charged; by creating a portfolio of put options on interest rates or call options on discount bonds. Collars specify both the upper and lower limits for the rate that will be charged. A collar is a combination of a long position in a cap and a short position in a floor. Swaps represent a series of forward transactions in which the counter parties agree to buy and sell a stream of cash flows on a notional principal amount over a predetermined length of time. The cash flows exchanged in a swap can be based on fixed or floating interest rates and on the same or different currencies. Interest rate swaps involve only the exchange of interest payments, while currency swaps also entail the exchange of principal amounts.

Index Funds

Index funds are based on portfolios of securities or bonds that are purchased in the same proportion as they are weighted on an exchange such as the Toronto Stock Exchange 300 Composite Index or the Dow Jones Industrial Average. Investors do not actually purchase an amount of each type of stock or bond included in the index. Instead, investors hold shares in a fund or other intermediary that holds shares of each of these companies, weighted according to how the index weights each company's shares.

Index funds are intended to mirror movements in a broad market. Therefore, if an individual has purchased a broad index, such as the Dow Jones Industrial or the TSE 300 Composite Index, when the market is up, a Dow Jones or TSE 300 index fund will be up; when the market is down, the index fund will be down.

There are two major advantages of index funds. The first is broad diversification, since indices typically contain stock or bonds from a wide range of sectors or countries. Traditional stock or bond investing tries to "beat the market" where as index investing "buys the market." By emulating the performance of a particular market index such as the Toronto

Stock Exchange 300 Composite Index or Standard & Poor's 500 Total Return Index in the United States, investors can reduce their market risk.

The second advantage, is lower management expense ratios (MERs). Index funds are "passively managed": the investment manager does not try to outperform the market but rather purchases those shares in quantities pre-determined by the index, in effect becoming the market. There is no decision-making as to what stocks to purchase and in what proportion.

The movement toward investment in index funds in the past few years is based on the assumption that globalization and unification of markets is causing markets to become increasingly efficient and hence correlated. The more efficient a market, the more difficult it is for a fund manager to add value through the search, purchase, and sale of mis-priced assets. Portfolio theory has proven that one of the best means of maximizing return and minimizing risk is to own the market itself. Purchasing an index fund effectively allows individual investors to purchase the market, whether it is the TSE 300 Composite Index, the Dow Jones Industrial Average, the Standard & Poor 500 Total Return Index, or the Morgan Stanley Capital Investment International Stock Fund.

Appendix D Estimates of foregone capital accumulation

Using the tables

The tables in sections D(1) through D(9) of Appendix D contain the individual estimates of foregone capital accumulation. Each of the nine sections of the Appendix gives estimates for nine profiles of investors derived from combinations of ages 25, 35, and 45 and incomes of \$20,000, \$40,000 and \$60,000 per year. Each section has two tables, one with estimates for 0 percent wage growth and another for estimates for 1 percent real wage growth. Each table includes four savings rates (2 percent, 5 percent, 10 percent, and 15 percent), five levels of risk tolerance (low, moderate, average, high, and aggressive) and shows returns calculated with and without management expense ratios MERs).

To use the tables, do the following:

- 1 identify the section of Appendix D that best approximates your age and income level;
- 2 identify the rows of the tables that approximate your savings rate;
- 3 identify the column of the tables that approximates your risk tolerance.²³

Once these factors are determined the reader can locate four separate estimates of foregone capital accumulation: 0 percent wage growth with no MER, 0 percent wage growth with MER, 1 percent wage growth with no MER, and 1 percent wage growth with MER.

In addition to the tables in sections D(1) through D(9) of Appendix D, Appendix E offers relative comparisons of the estimates of foregone capital accumulation. Specifically, Appendix E shows estimates of foregone capital accumulation relative to total savings.

MERs and adjusted returns

Each table shows

	Total Return	MER	Adjusted Return
TSE300 Composite Index	13.50%	1.85%	11.65%
MSCI World Stock Index	16.59%	1.05%	15.54%
Differential	3.09%	0.80%	3.89%

The MER used for the TSE 300 Composite Index is the average No-Load Domestic Equity MER assessed in Canada. The MER for the MSCI World Stock Index is the average No-Load International Equity MER assessed in the United States. The total returns are adjusted by the respective MERs to arrive at the adjusted returns.

Sources

Ambachtsheer 1995; Ernst & Young Consultants 1997; Guillette, Gallant and Cerulli 1997. Data from these reports was independently analyzed by the authors to calculate the figures contained in the tables

Estimates of foregone capital accumulation Section D(1)

Individual Profile	Age	25 Years
	Income	\$ 20,000
	Years of Savings	40 Years

Table 1: 0 Percent Real Wage Growth

	No Management Expense Ratio				
	Low Risk (10% Equity)	Moderate Risk (20% Equity)	Average Risk (30% Equity)	High Risk (40% Equity)	Aggressive Risk (50% Equity)
Modest Saving (2%)	3,213	6,427	9,640	12,854	16,067
Average Saving (5%)	8,034	16,067	24,101	32,135	40,168
High Saving (10%)	16,067	32,135	48,202	64,269	80,336
Aggressive Saving (15%)	24,101	48,202	72,303	96,404	120,505

	Management Expense Ratio				
	Low Risk (10% Equity)	Moderate Risk (20% Equity)	Average Risk (30% Equity)	High Risk (40% Equity)	Aggressive Risk (50% Equity)
Modest Saving (2%)	3,888	7,776	11,664	15,552	19,440
Average Saving (5%)	9,720	19,440	29,160	38,880	48,600
High Saving (10%)	19,440	38,880	58,320	77,759	97,199
Aggressive Saving (15%)	29,160	58,320	87,479	116,639	145,799

Table 2: 1 Percent Real Wage Growth

	No Management Expense Ratio				
	Low Risk (10% Equity)	Moderate Risk (20% Equity)	Average Risk (30% Equity)	High Risk (40% Equity)	Aggressive Risk (50% Equity)
Modest Saving (2%)	3,787	7,574	11,361	15,148	18,934
Average Saving (5%)	9,467	18,934	28,402	37,869	47,336
High Saving (10%)	18,934	37,869	56,803	75,738	94,672
Aggressive Saving (15%)	28,402	56,803	85,205	113,606	142,008

	Management Expense Ratio				
	Low Risk (10% Equity)	Moderate Risk (20% Equity)	Average Risk (30% Equity)	High Risk (40% Equity)	Aggressive Risk (50% Equity)
Modest Saving (2%)	4,536	9,072	13,608	18,144	22,680
Average Saving (5%)	11,340	22,680	34,020	45,361	56,701
High Saving (10%)	22,680	45,361	68,041	90,721	113,401
Aggressive Saving (15%)	34,020	68,041	102,061	136,082	170,102

Estimates of foregone capital accumulation Section D(2)

Individual Profile	Age	25 Years
	Income	\$ 40,000
	Years of Savings	40 Years

Table 1: 0 Percent Real Wage Growth

	No Management Expense Ratio				
	Low Risk (10% Equity)	Moderate Risk (20% Equity)	Average Risk (30% Equity)	High Risk (40% Equity)	Aggressive Risk (50% Equity)
Modest Saving (2%)	6,427	12,854	19,281	25,708	32,135
Average Saving (5%)	16,067	32,135	48,202	64,269	80,336
High Saving (10%)	32,135	64,269	96,404	128,538	160,673
Aggressive Saving (15%)	48,202	96,404	144,606	192,807	241,009

	Management Expense Ratio				
	Low Risk (10% Equity)	Moderate Risk (20% Equity)	Average Risk (30% Equity)	High Risk (40% Equity)	Aggressive Risk (50% Equity)
Modest Saving (2%)	7,776	15,552	23,328	31,104	38,880
Average Saving (5%)	19,440	38,880	58,320	77,759	97,199
High Saving (10%)	38,880	77,759	116,639	155,519	194,399
Aggressive Saving (15%)	58,320	116,639	174,959	233,278	291,598

Table 2: 1 Percent Real Wage Growth

	No Management Expense Ratio				
	Low Risk (10% Equity)	Moderate Risk (20% Equity)	Average Risk (30% Equity)	High Risk (40% Equity)	Aggressive Risk (50% Equity)
Modest Saving (2%)	7,574	15,148	22,721	30,295	37,869
Average Saving (5%)	18,934	37,869	56,803	75,738	94,672
High Saving (10%)	37,869	75,738	113,606	151,475	189,344
Aggressive Saving (15%)	56,803	113,606	170,409	227,213	284,016

	Management Expense Ratio				
	Low Risk (10% Equity)	Moderate Risk (20% Equity)	Average Risk (30% Equity)	High Risk (40% Equity)	Aggressive Risk (50% Equity)
Modest Saving (2%)	9,072	18,144	27,216	36,288	45,361
Average Saving (5%)	22,680	45,361	68,041	90,721	113,401
High Saving (10%)	45,361	90,721	136,082	181,442	226,803
Aggressive Saving (15%)	68,041	136,082	204,123	272,163	340,204

Estimates of foregone capital accumulation Section D(3)

Individual Profile	Age	25 Years
	Income	\$ 60,000
	Years of Savings	40 Years

Table 1: 0 Percent Real Wage Growth

	No Management Expense Ratio				
	Low Risk (10% Equity)	Moderate Risk (20% Equity)	Average Risk (30% Equity)	High Risk (40% Equity)	Aggressive Risk (50% Equity)
Modest Saving (2%)	9,640	19,281	28,921	38,561	48,202
Average Saving (5%)	24,101	48,202	72,303	96,404	120,505
High Saving (10%)	48,202	96,404	144,606	192,807	241,009
Aggressive Saving (15%)	72,303	144,606	216,908	289,211	361,514

	Management Expense Ratio				
	Low Risk (10% Equity)	Moderate Risk (20% Equity)	Average Risk (30% Equity)	High Risk (40% Equity)	Aggressive Risk (50% Equity)
Modest Saving (2%)	11,664	23,328	34,992	46,656	58,320
Average Saving (5%)	29,160	58,320	87,479	116,639	145,799
High Saving (10%)	58,320	116,639	174,959	233,278	291,598
Aggressive Saving (15%)	87,479	174,959	262,438	349,918	437,397

Table 2: 1 Percent Real Wage Growth

	No Management Expense Ratio				
	Low Risk (10% Equity)	Moderate Risk (20% Equity)	Average Risk (30% Equity)	High Risk (40% Equity)	Aggressive Risk (50% Equity)
Modest Saving (2%)	11,361	22,721	34,082	45,443	56,803
Average Saving (5%)	28,402	56,803	85,205	113,606	142,008
High Saving (10%)	56,803	113,606	170,409	227,213	284,016
Aggressive Saving (15%)	85,205	170,409	255,614	340,819	426,024

	Management Expense Ratio				
	Low Risk (10% Equity)	Moderate Risk (20% Equity)	Average Risk (30% Equity)	High Risk (40% Equity)	Aggressive Risk (50% Equity)
Modest Saving (2%)	13,608	27,216	40,825	54,433	68,041
Average Saving (5%)	34,020	68,041	102,061	136,082	170,102
High Saving (10%)	68,041	136,082	204,123	272,163	340,204
Aggressive Saving (15%)	102,061	204,123	306,184	408,245	510,306

Estimates of foregone capital accumulation Section D(4)

Individual Profile	Age	35 Years
	Income	\$ 20,000
	Years of Savings	30 Years

Table 1: 0 Percent Real Wage Growth

	No Management Expense Ratio				
	Low Risk (10% Equity)	Moderate Risk (20% Equity)	Average Risk (30% Equity)	High Risk (40% Equity)	Aggressive Risk (50% Equity)
Modest Saving (2%)	2,031	4,061	6,092	8,123	10,153
Average Saving (5%)	5,077	10,153	15,230	20,307	25,383
High Saving (10%)	10,153	20,307	30,460	40,613	50,767
Aggressive Saving (15%)	15,230	30,460	45,690	60,920	76,150

	Management Expense Ratio				
	Low Risk (10% Equity)	Moderate Risk (20% Equity)	Average Risk (30% Equity)	High Risk (40% Equity)	Aggressive Risk (50% Equity)
Modest Saving (2%)	2,328	4,657	6,985	9,313	11,641
Average Saving (5%)	5,821	11,641	17,462	23,283	29,104
High Saving (10%)	11,641	23,283	34,924	46,566	58,207
Aggressive Saving (15%)	17,462	34,924	52,387	69,849	87,311

Table 2: 1 Percent Real Wage Growth

	No Management Expense Ratio				
	Low Risk (10% Equity)	Moderate Risk (20% Equity)	Average Risk (30% Equity)	High Risk (40% Equity)	Aggressive Risk (50% Equity)
Modest Saving (2%)	2,311	4,622	6,932	9,243	11,554
Average Saving (5%)	5,777	11,554	17,331	23,108	28,884
High Saving (10%)	11,554	23,108	34,661	46,215	57,769
Aggressive Saving (15%)	17,331	34,661	51,992	69,323	86,653

	Management Expense Ratio				
	Low Risk (10% Equity)	Moderate Risk (20% Equity)	Average Risk (30% Equity)	High Risk (40% Equity)	Aggressive Risk (50% Equity)
Modest Saving (2%)	2,634	5,268	7,901	10,535	13,169
Average Saving (5%)	6,585	13,169	19,754	26,338	32,923
High Saving (10%)	13,169	26,338	39,507	52,677	65,846
Aggressive Saving (15%)	19,754	39,507	59,261	79,015	98,769

Estimates of foregone capital accumulation Section D(5)

Individual Profile	Age	35 Years
	Income	\$ 40,000
	Years of Savings	30 Years

Table 1: 0 Percent Real Wage Growth

	No Management Expense Ratio				
	Low Risk (10% Equity)	Moderate Risk (20% Equity)	Average Risk (30% Equity)	High Risk (40% Equity)	Aggressive Risk (50% Equity)
Modest Saving (2%)	4,061	8,123	12,184	16,245	20,307
Average Saving (5%)	10,153	20,307	30,460	40,613	50,767
High Saving (10%)	20,307	40,613	60,920	81,227	101,534
Aggressive Saving (15%)	30,460	60,920	91,380	121,840	152,301

	Management Expense Ratio				
	Low Risk (10% Equity)	Moderate Risk (20% Equity)	Average Risk (30% Equity)	High Risk (40% Equity)	Aggressive Risk (50% Equity)
Modest Saving (2%)	4,657	9,313	13,970	18,626	23,283
Average Saving (5%)	11,641	23,283	34,924	46,566	58,207
High Saving (10%)	23,283	46,566	69,849	93,132	116,415
Aggressive Saving (15%)	34,924	69,849	104,773	139,698	174,622

Table 2: 1 Percent Real Wage Growth

	No Management Expense Ratio				
	Low Risk (10% Equity)	Moderate Risk (20% Equity)	Average Risk (30% Equity)	High Risk (40% Equity)	Aggressive Risk (50% Equity)
Modest Saving (2%)	4,622	9,243	13,865	18,486	23,108
Average Saving (5%)	11,554	23,108	34,661	46,215	57,769
High Saving (10%)	23,108	46,215	69,323	92,430	115,538
Aggressive Saving (15%)	34,661	69,323	103,984	138,645	173,307

	Management Expense Ratio				
	Low Risk (10% Equity)	Moderate Risk (20% Equity)	Average Risk (30% Equity)	High Risk (40% Equity)	Aggressive Risk (50% Equity)
Modest Saving (2%)	5,268	10,535	15,803	21,071	26,338
Average Saving (5%)	13,169	26,338	39,507	52,677	65,846
High Saving (10%)	26,338	52,677	79,015	105,353	131,692
Aggressive Saving (15%)	39,507	79,015	118,522	158,030	197,537

Estimates of foregone capital accumulation Section D(6)

Individual Profile	Age	35 Years
	Income	\$ 60,000
	Years of Savings	30 Years

Table 1: 0 Percent Real Wage Growth

	No Management Expense Ratio				
	Low Risk (10% Equity)	Moderate Risk (20% Equity)	Average Risk (30% Equity)	High Risk (40% Equity)	Aggressive Risk (50% Equity)
Modest Saving (2%)	6,092	12,184	18,276	24,368	30,460
Average Saving (5%)	15,230	30,460	45,690	60,920	76,150
High Saving (10%)	30,460	60,920	91,380	121,840	152,301
Aggressive Saving (15%)	45,690	91,380	137,071	182,761	228,451

	Management Expense Ratio				
	Low Risk (10% Equity)	Moderate Risk (20% Equity)	Average Risk (30% Equity)	High Risk (40% Equity)	Aggressive Risk (50% Equity)
Modest Saving (2%)	6,985	13,970	20,955	27,940	34,924
Average Saving (5%)	17,462	34,924	52,387	69,849	87,311
High Saving (10%)	34,924	69,849	104,773	139,698	174,622
Aggressive Saving (15%)	52,387	104,773	157,160	209,547	261,934

Table 2: 1 Percent Real Wage Growth

	No Management Expense Ratio				
	Low Risk (10% Equity)	Moderate Risk (20% Equity)	Average Risk (30% Equity)	High Risk (40% Equity)	Aggressive Risk (50% Equity)
Modest Saving (2%)	6,932	13,865	20,797	27,729	34,661
Average Saving (5%)	17,331	34,661	51,992	69,323	86,653
High Saving (10%)	34,661	69,323	103,984	138,645	173,307
Aggressive Saving (15%)	51,992	103,984	155,976	207,968	259,960

	Management Expense Ratio				
	Low Risk (10% Equity)	Moderate Risk (20% Equity)	Average Risk (30% Equity)	High Risk (40% Equity)	Aggressive Risk (50% Equity)
Modest Saving (2%)	7,901	15,803	23,704	31,606	39,507
Average Saving (5%)	19,754	39,507	59,261	79,015	98,769
High Saving (10%)	39,507	79,015	118,522	158,030	197,537
Aggressive Saving (15%)	59,261	118,522	177,784	237,045	296,306

Estimates of foregone capital accumulation Section D(7)

Individual Profile	Age	45 Years
	Income	\$ 20,000
	Years of Savings	20 Years

Table 1: 0 Percent Real Wage Growth

	No Management Expense Ratio				
	Low Risk (10% Equity)	Moderate Risk (20% Equity)	Average Risk (30% Equity)	High Risk (40% Equity)	Aggressive Risk (50% Equity)
Modest Saving (2%)	1,158	2,316	3,475	4,633	5,791
Average Saving (5%)	2,896	5,791	8,687	11,582	14,478
High Saving (10%)	5,791	11,582	17,373	23,165	28,956
Aggressive Saving (15%)	8,687	17,373	26,060	34,747	43,433

	Management Expense Ratio				
	Low Risk (10% Equity)	Moderate Risk (20% Equity)	Average Risk (30% Equity)	High Risk (40% Equity)	Aggressive Risk (50% Equity)
Modest Saving (2%)	1,263	2,527	3,790	5,054	6,317
Average Saving (5%)	3,159	6,317	9,476	12,634	15,793
High Saving (10%)	6,317	12,634	18,951	25,269	31,586
Aggressive Saving (15%)	9,476	18,951	28,427	37,903	47,379

Table 2: 1 Percent Real Wage Growth

	No Management Expense Ratio				
	Low Risk (10% Equity)	Moderate Risk (20% Equity)	Average Risk (30% Equity)	High Risk (40% Equity)	Aggressive Risk (50% Equity)
Modest Saving (2%)	1,268	2,535	3,803	5,071	6,338
Average Saving (5%)	3,169	6,338	9,507	12,676	15,845
High Saving (10%)	6,338	12,676	19,014	25,353	31,691
Aggressive Saving (15%)	9,507	19,014	28,522	38,029	47,536

	Management Expense Ratio				
	Low Risk (10% Equity)	Moderate Risk (20% Equity)	Average Risk (30% Equity)	High Risk (40% Equity)	Aggressive Risk (50% Equity)
Modest Saving (2%)	1,379	2,758	4,137	5,516	6,895
Average Saving (5%)	3,447	6,985	10,342	13,790	17,237
High Saving (10%)	6,895	13,790	20,684	27,579	34,474
Aggressive Saving (15%)	10,342	20,684	31,026	41,369	51,711

Estimates of foregone capital accumulation Section D(8)

Individual Profile	Age	45 Years
	Income	\$ 40,000
	Years of Savings	20 Years

Table 1: 0 Percent Real Wage Growth

	No Management Expense Ratio				
	Low Risk (10% Equity)	Moderate Risk (20% Equity)	Average Risk (30% Equity)	High Risk (40% Equity)	Aggressive Risk (50% Equity)
Modest Saving (2%)	2,316	4,633	6,949	9,266	11,582
Average Saving (5%)	5,791	11,582	17,373	23,165	28,956
High Saving (10%)	11,582	23,165	34,747	46,329	57,911
Aggressive Saving (15%)	17,373	34,747	52,120	69,494	86,867

	Management Expense Ratio				
	Low Risk (10% Equity)	Moderate Risk (20% Equity)	Average Risk (30% Equity)	High Risk (40% Equity)	Aggressive Risk (50% Equity)
Modest Saving (2%)	2,527	5,054	7,581	10,107	12,634
Average Saving (5%)	6,317	12,634	18,951	25,269	31,586
High Saving (10%)	12,634	25,269	37,903	50,537	63,171
Aggressive Saving (15%)	18,951	37,903	56,854	75,806	94,757

Table 2: 1 Percent Real Wage Growth

	No Management Expense Ratio				
	Low Risk (10% Equity)	Moderate Risk (20% Equity)	Average Risk (30% Equity)	High Risk (40% Equity)	Aggressive Risk (50% Equity)
Modest Saving (2%)	2,535	5,071	7,606	10,141	12,676
Average Saving (5%)	6,338	12,676	19,014	25,353	31,691
High Saving (10%)	12,676	25,353	38,029	50,705	63,382
Aggressive Saving (15%)	19,014	38,029	57,043	76,058	95,072

	Management Expense Ratio				
	Low Risk (10% Equity)	Moderate Risk (20% Equity)	Average Risk (30% Equity)	High Risk (40% Equity)	Aggressive Risk (50% Equity)
Modest Saving (2%)	2,758	5,516	8,274	11,032	13,790
Average Saving (5%)	6,895	13,790	20,684	27,579	34,474
High Saving (10%)	13,790	27,579	41,369	55,158	68,948
Aggressive Saving (15%)	20,684	41,369	62,053	82,737	103,421

Estimates of foregone capital accumulation Section D(9)

Individual Profile	Age	45 Years
	Income	\$ 60,000
	Years of Savings	20 Years

Table 1: 0 Percent Real Wage Growth

	No Management Expense Ratio				
	Low Risk (10% Equity)	Moderate Risk (20% Equity)	Average Risk (30% Equity)	High Risk (40% Equity)	Aggressive Risk (50% Equity)
Modest Saving (2%)	3,475	6,949	10,424	13,899	17,373
Average Saving (5%)	8,687	17,373	26,060	34,747	43,433
High Saving (10%)	17,373	34,747	52,120	69,494	86,867
Aggressive Saving (15%)	26,060	52,120	78,180	104,240	130,300

	Management Expense Ratio				
	Low Risk (10% Equity)	Moderate Risk (20% Equity)	Average Risk (30% Equity)	High Risk (40% Equity)	Aggressive Risk (50% Equity)
Modest Saving (2%)	3,790	7,581	11,371	15,161	18,951
Average Saving (5%)	9,476	18,951	28,427	37,903	47,379
High Saving (10%)	18,951	37,903	56,854	75,806	94,757
Aggressive Saving (15%)	28,427	56,854	85,281	113,709	142,136

Table 2: 1 Percent Real Wage Growth

	No Management Expense Ratio				
	Low Risk (10% Equity)	Moderate Risk (20% Equity)	Average Risk (30% Equity)	High Risk (40% Equity)	Aggressive Risk (50% Equity)
Modest Saving (2%)	3,803	7,606	11,409	15,212	19,014
Average Saving (5%)	9,507	19,014	28,522	38,029	47,536
High Saving (10%)	19,014	38,029	57,043	76,058	95,072
Aggressive Saving (15%)	28,522	57,043	85,565	114,087	142,609

	Management Expense Ratio				
	Low Risk (10% Equity)	Moderate Risk (20% Equity)	Average Risk (30% Equity)	High Risk (40% Equity)	Aggressive Risk (50% Equity)
Modest Saving (2%)	4,137	8,274	12,411	16,547	20,684
Average Saving (5%)	10,342	20,684	31,026	41,369	51,711
High Saving (10%)	20,684	41,369	62,053	82,737	103,421
Aggressive Saving (15%)	31,026	62,053	93,079	124,106	155,132

Appendix E Foregone capital accumulation relative to total savings

Table 1: 0 Percent Real Wage Growth

	No Management Expense Ratio				
	Low Risk (10% Equity)	Moderate Risk (20% Equity)	Average Risk (30% Equity)	High Risk (40% Equity)	Aggressive Risk (50% Equity)
Age 25	18.8%	37.6%	56.4%	75.2%	94.0%
Age 35	16.0%	32.0%	48.0%	64.0%	79.9%
Age 45	13.6%	27.3%	40.9%	54.6%	68.2%

	Management Expense Ratio				
	Low Risk (10% Equity)	Moderate Risk (20% Equity)	Average Risk (30% Equity)	High Risk (40% Equity)	Aggressive Risk (50% Equity)
Age 25	22.5%	45.0%	67.5%	90.1%	112.6%
Age 35	18.2%	36.5%	54.7%	72.9%	91.1%
Age 45	14.8%	29.7%	44.5%	59.3%	74.2%

Table 2: 1 Percent Real Wage Growth

	No Management Expense Ratio				
	Low Risk (10% Equity)	Moderate Risk (20% Equity)	Average Risk (30% Equity)	High Risk (40% Equity)	Aggressive Risk (50% Equity)
Age 25	19.6%	39.2%	58.8%	78.4%	98.0%
Age 35	16.4%	32.8%	49.1%	65.5%	81.9%
Age 45	13.8%	27.6%	41.4%	55.2%	68.9%

	Management Expense Ratio				
	Low Risk (10% Equity)	Moderate Risk (20% Equity)	Average Risk (30% Equity)	High Risk (40% Equity)	Aggressive Risk (50% Equity)
Age 25	23.7%	47.4%	71.1%	94.8%	118.5%
Age 35	18.8%	37.6%	56.3%	75.1%	93.9%
Age 45	15.0%	30.1%	45.1%	60.2%	75.2%



Notes

- 1 According to the Canadian Institute of Actuaries, an “adequate” level of retirement income means “having 80 percent of employment earnings up to one-third of the average wage, plus 70 percent of employment earnings over one-third of the average wage.” A general rule of thumb used to ensure that post-retirement income is adequate to maintain a retiree’s standard of living is 75 percent of preretirement income. That is, retirees must be able to provide 75 percent of their employment earnings through a combination of public social-security benefits and private savings.
- 2 There continues to be a great deal of debate over what constitutes “low income”; for a full discussion of the issues and statistics regarding poverty and low income, see Sarlo 1996, 1998; Wolfson and Evans 1990; Statistics Canada 1997a; Oja 1987; Podulik 1968; Statistics Canada 1998; National Council of Welfare 1995; Conference Board of Canada 1996.
- 3 The rates of return included in the government actuarial reports and referred to in this section are Internal Rates of Return.
- 4 The rates presented in table 1 are based on CPP statutory projections of earnings and prices contained in the Seventeenth Annual Actuarial Report on the CPP, and represent gross effective rates of return. The long-term annual rate of inflation is assumed to be 3 percent.
- 5 Information on the yields of Government of Canada issues as well as data on the Bank of Canada are available on the internet at www.bank-banque-canada.ca.
- 6 Pay-as-you-go systems do not accumulate contributions in order to finance benefits at a later time. Rather, pay-as-you-go systems use the contributions of current workers to pay for the benefits of current retirees.
- 7 The focus of an unfunded liabilities analysis is the actuarial valuation. This valuation assesses the ability of a program to finance the stated benefits for a specific time period given the contribution rates, expected investment returns, and specific economic and demographic assumptions. Actuarial valuations are extremely sensitive to their underlying assumptions. The assumptions for most program valuations are: inflation of 3.5 percent; wage growth of 4.5 percent; and an interest rate of 6.0 percent. Changes in these assumptions can cause significant deviations in the results.
- 8 For information on social-security reform, see Association of Canadian Pension Management 1993; Mitchell and O’Quinn 1997; Ferrara, Goodman, and Matthews 1995; Asher 1995. The Social Security Privatization Project headed by the Cato Institute has numerous publications available including Feldstein 1997; Altig and Gokhale 1997; Shirley and Spiegler 1998. See also information on the International Center for Pension Reform at www.pensionreform.org.
- 9 The percentage of pre-retirement income replaced by public benefits varies with income. Obviously, high-income earners will receive substantially less than low-income earners in public benefits as a percentage of total post-retirement income.
- 10 The time horizon may vary. For instance, all fixed-income instruments, except those made in perpetuity, have a specific time schedule over which interest and principal must be paid. Alternatively, stocks never have an expiration date and are assumed to remit dividend payments in perpetuity.
- 11 *Financial Post Magazine*, (July 1998), Top 50 Companies Report, available on the Internet at www.canoec.com/FP_Top50.
- 12 Information is referenced from the company’s 1997 Annual Report.
- 13 Independently verified through communication with Investors Edge (Canadian Imperial Bank of Commerce) and Greenline Securities (Toronto-Dominion Bank).
- 14 It is important to note that derivatives have a multitude of investment purposes, as explained in Appendix C. Derivatives can and, indeed, should be used as a method to manage risk by securing the price of assets for particular periods. Derivatives can also be used as speculative instruments. In this section we discuss the use

- of derivatives in the provision of a specific product in the mutual fund industry as opposed to discussing the particulars of derivatives.
- 15 Derivatives have a number of purposes including risk management and speculation. The focus on the ability of derivatives to mirror the performance of an underlying asset should be viewed within the confines of the study rather than any particular assessment of the validity and usefulness of derivatives themselves.
 - 16 It is interesting to note the lack or absence of parallel product development (one product based on derivatives and the other on the underlying assets) in the United States and Europe.
 - 17 Specific data is available for TD mutual funds on the internet at www.tdbank.ca/tdbank/mutual.
 - 18 Specific data is available for CIBC mutual funds on the Internet at www.cibc.com/products/investment/mfunds.
 - 19 It is instructive to remember that savings are only eligible under RRSPs when the gross income of the individual is less than or equal to \$75,000 per annum and the individual saves less than 18 percent of their gross income. An individual making more than \$75,000 or saving more than 18 percent of income would be forced to save a portion of the funds outside of tax-sheltered RRSPs due to the limitations placed on contributions.
 - 20 The key value for the loss estimates is not the annual average yield but rather the average annual differential between the two rates. Also, the average annual rates of return are stated in Canadian dollars. The yield garnered from the Morgan Stanley Capital Investment fund was translated into Canadian dollars each year. Therefore, any adjustment for inflation over the time period would only affect the two yields; it would not change the differential.
 - 21 The study did not undertake to assess the effect of the Foreign Property Rule on MERs in Canada. They are included as an additional factor contributing to the investment losses incurred by Canadians. However, it is entirely plausible that the restrictions inherent in the FPR explain, at least to a certain extent the higher MERs present in the Canadian mutual-fund market. Another possible explanation for the higher MERs in Canada is the difference in regulatory regimes; Canada has multiple regulators while the United States has a much more consolidated regulatory system.
 - 22 Figures and estimates provided by the Investment Funds Institute of Canada (IFIC); available on the Internet at www.mutfunds.com/ific.
 - 23 It is important to acknowledge again that the estimates are based on a host of assumptions. Any deviation from the assumptions would thus likely increase the size of the losses incurred.
 - 24 This particular profile was selected because it is the median example available from the tables included in Appendices D(1) through D(9).
 - 25 The average RRSP contribution for all contributors in 1995 was \$3,695.



References

- Global Funds (1999). Index Funds . Available on the internet at www.globefund.com
- Alexander, Jared, and Joel Emes (1998). *Canadian Government Debt: A Guide to the Indebtedness of Canada and the Provinces*. Critical Issues Bulletin. Vancouver, BC: The Fraser Institute.
- Ambachtsheer, Keith P. (1995). *Canada's 20% Foreign Property Rule: Why and How It Should Be Eliminated*. Position Paper commissioned by the Pension Investment Association of Canada (PIAC) and the Investment Funds Institute of Canada (IFIC).
- Asher, Mukul G. (1995). *Compulsory Savings in Singapore: An Alternative to the Welfare State*. National Center for Policy Analysis, Dallas, Texas. Available on the internet at www.ncpa.org.
- Association of Canadian Pension Management (ACPM) (1995). *A Retirement Income Strategy for Canada: Creating the Best Retirement Income System in the World*. Available on the internet at www.acpm.org.
- Atkinson, Michael, and William Coleman (1989). *The State Business and Industrial Change in Canada*. Toronto: University of Toronto Press.
- Baker, Edward (1998). Index Fund Management around the World. *Canadian Investment Review* (Winter). Available on the internet at www.benefitscanada.com.
- Bartonlini, Leonardo, and Allan Drazen (1997). Capital-Account Liberalization as a Signal. *American Economic Review* 87(1): 138–54.
- Bekaert, Campbell H., and Robin Lumsdaine (1998). Dating the Integration of World Equity Markets. National Bureau of Economic Research, Working Paper No 6724.
- Berkowitz, Michael, and Y. Kotowitz (1997a). Management Compensation and the Performance of Mutual Funds. Working Paper (April). University of Toronto, Department of Economics and Institute for Policy Analysis.
- (1997b) The Determinants of Management Expenses. Working Paper (June). University of Toronto, Department of Economics and Institute for Policy Analysis.
- Brodeur, Pierre (1998). The Changing Face of Money Management and Risk. *Canadian Investment Review* 3, 11 (Fall): 37–38. Available on the internet at www.benefitscanada.com.
- Brown, Aaron (1997). Value-At-Risk. *Derivatives Strategy* (March). Available on the web at www.derivatives.com/archives/1997/0397col1.html.
- Burgess, David, and Joel Fried (1998). *Canadian Tax Deferred Savings Plans and the Foreign Property Rule*. Research Report 9806. London, ON: University of Western Ontario.
- Canadian Bankers Association (1998). *Canadian Bank Facts, 1997/98 Edition*. Toronto, ON: Canadian Bankers Association.
- Canadian Institute of Actuaries (1993). *Canadian Retirement Income and Social Security Programs*. Report of the Task Force on Social Security Financing. Ottawa: Canadian Institute of Actuaries.
- (1995). *Troubled Tomorrows: The Report of the Canadian Institute of Actuaries' Task Force on Retirement Savings* (January).
- Canadian Securities Institute (1993). *The Canadian Securities Course*. Toronto, ON: Canadian Securities Institute.
- Chicago Board Options Exchange (1999). *The Basics*. Available on the internet at www.cboe.com
- Choudhri, E, and P. Sharma (1996). *Rationale and Implications for Canadian Trade and Investment Policy*. Policy Paper. Ottawa: Department of Foreign Affairs.
- Cooper, Sherry S. (1999). New Math on Retirement Savings. *The National Post* (February 10).
- Corcoran, Terence (1999). The Worst Place in World to Invest. *The National Post* (February 8).
- Conference Board of Canada (1998). *Maximizing Choice: Economic Impacts of Increasing the Foreign Property Limit*. Ottawa: Conference Board of Canada.
- Copeland, T., and F. Weston (1992). *Financial Theory and Corporate Policy*. New York: Addison-Wesley.
- Cornell, Camilla (1999). A Head Start is a Smart Start. *IE Money: Canadian Strategies for Financial Success* (February).

- Toronto, ON: IE Money. Available on the internet at www.iemoney.com
- Dahlby, Bev (1994). The Distortionary Effects of Raising Taxes. In W. Robson and W. Scarth (eds.), *Deficit Reduction: What Gain, What Pain* (Toronto: C.D. Howe Institute).
- Davis, Alfred H.R., and George E. Pinches (1988). *Canadian Financial Management*. New York: Harper & Row.
- De Matteo, Livio, and Michael Shannon (1995). Payroll Taxation in Canada: An Overview. *Canadian Business Economics* 3, 4 (Summer): 5–22.
- Easterly, William, and Sergio Rebelo (1993). Fiscal Policy and Economic Growth: An Empirical Investigation. Unpublished Manuscript.
- Emes, Joel (1998). RRSP Spending. *Fraser Forum* (April): 21–23. Available on the Internet at www.fraserinstitute.ca.
- Emes, Joel and Michael Walker (1999). *Tax Facts 11*. Vancouver, BC: The Fraser Institute.
- Ernst & Young Consultants (1997). *Analysis of the Impact of the Foreign Property Rule*. Paper commissioned by the Investment Funds Institute of Canada (IFIC).
- Farrell, Christopher (1997). The Real Decision. *Business Week* (February 22): 135–36.
- Ferrara, Peter J., John C. Goodman, and Merrill Matthews (1995). *Private Alternatives to Social Security in Other Countries*. Dallas, TX: National Center for Policy Analysis. Available on the internet at www.ncpa.org.
- Finance Canada (1996). The Seniors Benefit: Securing the Future. *Federal Budget*. Ottawa: Finance Canada 1996.
- Frankel, J. (1998). Why Economies Grow the Way They Do. *Canadian Business Economics* 6 (3): 3–13.
- Fraser Institute (1998). *Survey of Senior Investment Managers in Canada, Results for Spring 1998*. Vancouver, BC: The Fraser Institute.
- French, K., and J. Poterba (1991). Investor Diversification and International Equity Markets. *American Economic Review* 81(May): 222–26.
- Gallimore, Michael (1998). Retirement Investment Strategies. *Canadian Investment Review* (Winter): 23. Available on the internet at www.benefitscanada.com.
- Gonzalez-Hermosillo, Brenda (1994). The Microstructure of Financial Derivatives Markets: Exchange-Traded versus Over-the-Counter. Bank of Canada Working Paper (March).
- Guillette, Andrew, Dennis Gallant, and Kurt Cerulli (1997). *The Cerulli Report: Distribution Trends in the Canadian Mutual Fund Market*. Boston, MA: Cerulli & Associates.
- Gwartney, James, and Robert Lawson (1998). *Economic Freedom of the World, 1998/99 Interim Report*. Vancouver, BC: The Fraser Institute.
- Gwartney, James, and Richard Stroup (1993). *What Everyone Should Know about Economics and Prosperity*. Vancouver, BC: The Fraser Institute.
- Hamilton, Malcolm (1995). The Canada Pension Plan: Part of a Larger Problem. Paper presented to a Fraser Institute conference, *Replacing the Canada Pension Plan*, Toronto, Ontario, November 1995.
- Heckman, James (1993). What Has Been Learned about Labour Supply in the Past Twenty Years. *American Economic Review* 84 (2): 116–21.
- Human Resources Development Canada (1994). *Overview: Income Security Programs*. Ottawa, ON.
- Hutchinson, Bill (1998). Paying for Canada's Pensions. *Canadian Investment Review* (Winter): 14–17. Available on the internet at www.benefitscanada.com.
- Johnson, Lewis D., and Bohumir Pazderka (1995). *It's No Gamble: The Economic and Social Benefits of Stock Markets*. Vancouver, BC: The Fraser Institute.
- Kane, Michael (1998). Canada Near Bottom of List in Retirement Income Comparison. *The Vancouver Sun* (September 19): B1, B8.
- King, Robert, and Sergio Rebelo (1990). Public Policy and Economic Growth: Developing Neoclassical Implications. *Journal of Political Economy* 89: S126–S150.
- Law, Marc, and Fazil Mihlar (1996). *The Federal Liberal Government in Action: A Report Card Issued to the Chretien Government*. Critical Issues Bulletin. Vancouver, BC: The Fraser Institute.
- Louise, J.C. (1997). Worrying About Correlation. *Derivatives Strategy* (March). Available on the web at www.derivatives.com/archives/1997/0397fea3.html.
- MacKinnon, Mark (1999). Foreign Ownership Is on the Rise. *The Globe and Mail* (February 1): B1, B7.
- Marmer, Harry S. (1998). International Investing: A New Canadian Perspective. *Canadian Investment Review* (Winter): 49–51. Available on the internet at www.benefitscanada.com.
- Marsden, Keith (1983). *Links Between Taxes and Economic Growth: Some Empirical Evidence*. World Bank Staff Paper No. 605.
- McCarthy, Shawn (1998). CPP premiums to Stay Below 10%. *The Globe and Mail* (December 17): B1.
- McKinnon, Ronald, and H. Pill (1997). Credible Economic Liberalizations and Overborrowing. *American Economic Review* 87(2): 139–93.
- Merton, Robert (1998). Applications of Option-Pricing Theory: Twenty-Five Years Later. *American Economic Review* 88(3).

- Ministry of Finance (1998). Budget Estimates 1996–97. Ottawa, ON: Ministry of Supply and Services.
- (1999). Budget Estimates 1997–98. Ottawa, ON: Ministry of Supply and Services.
- Mitchell, Daniel J., and Robert P O’Quinn (1997). *Australia’s Privatized Retirement System: Lessons for the United States*. Washington, DC: The Heritage Foundation. Available on the internet at www.heritage.org.
- Office of the Superintendent of Financial Institutions, Department of Finance (1997). *Canada Pension Plan: Sixteenth Actuarial Report, September 1997*. Available on the internet at www.osfi-bsif.gc.ca.
- Office of the Superintendent of Financial Institutions, Department of Finance (1998). *Canada Pension Plan: Seventeenth Actuarial Report, December 1998*. Available on the internet at www.osfi-bsif.gc.ca.
- Options Clearing Corporation (1999). Understanding Stock Options. Available on the internet at www.optionsclearing.com.
- Organisation for Economic Cooperation and Development [OECD] (1994). *OECD Jobs Study: Part 1*. Paris: OECD.
- (1998). *OECD Economic Surveys 1998, Canada*, Paris: OECD.
- Parker, Ron (1995). Aspects of Economic Restructuring in Canada, 1989–1994. *Bank of Canada Review* (Summer): 23–34.
- Peterson, Peter (1999). The Global Aging Crisis. *Foreign Affairs* (January/February): 42–55.
- Reich, Robert (1992). *The Work of Nations*. New York: Vintage Books.
- Revenue Canada (1978). Income Tax Regulations: Part L, Deferred Income Plans, Foreign Property. Ottawa.
- (1992). Registered Retirement Savings Plans: Qualified Investments, Interpretation Bulletin (IT320R2). Ottawa.
- (1995). Foreign Property of Registered Plans: Interpretation Bulletin (IT-412R2). Ottawa.
- (1996). Registered Retirement Savings Plans: Information Circular (IC72-22R9). Ottawa.
- Scholes, Myron (1998). Derivatives in a Dynamic Economic. *American Economic Review* 88(3) (June): 350–70.
- Statistics Canada (1997). Canadian Economic Observer, Historical Statistical Supplement 1996/97. Cat. No. 11–210–XPB. Ottawa: Statistics Canada.
- (1998). Provincial Gross Domestic Product by Industry, 1984–1997. Ottawa: Statistics Canada.
- (various dates). Tax Statistics on Individuals, Annual Series 1979–1998. Ottawa: Statistics Canada.
- Tergesen, Anne, and Peter Coy (1999). Who Needs a Money Manager. *Business Week* (February 22): 127–32.
- Todaro, Michael (1989). *Economic Development in the Third World*. New York: Longman.
- Toronto Stock Exchange (1998). *TSE 1997 Fact Book*. Toronto, ON. Available on the internet at www.tse.com.
- Triest, Robert (1993). The Effects of Income Taxation on Labour Supply in the United States. *Journal of Human Resources* 25 (3): 491–516.
- Ture, Norman, and Kenneth Sanden (1977) *The Effects of Tax Policy on Capital Formation*. Washington, DC: Institute for Research on the Economics of Taxation.
- Turner, Garth (1999). Untitled column (February 8, 1999). Digital document www.garth.ca/articles/Ch107.html
- Vaz-Oxlade, Gail (1999). RRSP: 3 Grand Plans. *IE Money: Canadian Strategies for Financial Success* (February). Toronto, ON: IE Money. Available on the internet at www.ie-money.com.
- World Bank (1998). *World Development Indicators, 1998*. CD-ROM Version.