The Economic Opportunity Cost of Capital for Canada - An Empirical Update

Glenn Jenkins
Queen's University, Kingston, On, Canada

Chun-Yan Kuo
Queen's University, Kingston, On, Canada

Department of Economics
Queen's University
94 University Avenue
Kingston, Ontario, Canada
K7L 3N6

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-- An Empirical Update --

**Glenn P. Jenkins, Queen's University, Canada, and
Eastern Mediterranean University, Cyprus
e-mail: jenkins@ econ.queensu.ca**

**Chun-Yan Kuo, Queen's University, Canada
e-mail: gkuo@usa.net**

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Abstract

The social or economic discount rate is the threshold rate used to calculate the net present value of an investment project, a program or a regulatory intervention to see whether the proposed expenditures are economically worthwhile to undertake. The size of the economic rate of discount has been a policy issue in Canada for many years. The debate has been primarily concerned with the empirical measurement of the economic opportunity cost of funds. The purpose of this paper is to reexamine and update the empirical estimation of what is the appropriate economic discount rate for Canada. The results suggest that estimates of the economic discount rate can range from 7.78 percent to 8.39 percent real. As a consequence, we conclude that for Canada an 8 percent real rate is an appropriate discount rate to use when calculating the economic net present value of the flows of economic benefits and costs over time.

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I.   Alternative Approaches to Finding the Economic Net Present Value

Choosing the correct economic discount rate has been one of the most continuous issues in the field of cost-benefit analysis. This discount rate is used to calculate the economic net present value of the resource cost and the benefits that accrue over time from an investment or policy initiative according to the net present value criterion. If the net present value of a project is positive then from the perspective of a country the project is worthwhile to implement. If it is negative, the project should not be undertaken. Because the size of the discount rate is so important in determining whether the economic NPV of a project or program is positive or negative, the choice of rate to be used is often a controversial issue. The economic discount rate is similar to the concept of the private opportunity cost of capital used to discount the financial cash flows of an investment to find its financial net present value. The issues raised in the determination of the economic discount rate are, however, fundamental to our understanding of how scarce resources are allocated within the economy.

People prefer to make payments later and receive benefits sooner. This is due to the fact that they have a time preference for current consumption over future consumption. Similarly, there is an opportunity cost of the resources used in an activity as they could have been invested elsewhere and produced a positive return that could be consumed later. This opportunity cost needs to be taken into consideration in the appraisal of any proposal that involves the creation of costs and benefits that occur in different time periods.

One approach to economic discounting is based on the fact that present consumption is valued differently from future consumption. Following this approach all benefits and costs are first converted into quantities of consumption equivalents before being discounted. In this case, the discount rate is the rate of time preference at which individuals are willing to exchange consumption over time. To be analytically correct,

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under this approach all changes in investment outlays must be multiplied by the shadow price of investment to convert them into units of consumption. Estimates of the shadow price of investment forgone are typically significantly larger than one. After this is done then all the benefits and costs, now expressed in consumption units, can be discounted by the rate of time preference for consumption.[1]

Another approach considers what society forgoes in terms of the pre-tax returns of displaced investment in the country. Using this approach no account is made for time preference in terms of present versus future consumption. The discount rate is based purely on the opportunity cost of forgone investments.

An approach that captures the essential economic features of these two alternatives is to use a weighted average of the economic rate of return on private investment and the time preference rate for consumption.[2] This opportunity cost of capital measures the economic value of funds forgone in all their alternative uses in the private sectors of the economy when resources are shifted into the public sector. It captures the repercussions not only of the forgone consumption but also of the forgone investment due to the expenditures being undertaken.[3]

The social or economic discount rate is the threshold rate used to calculate the net present value of an investment project, a program or a regulatory intervention to see whether the proposed expenditures are economically feasible. The magnitude of the economic opportunity cost of the resources used by any public or private sector investment is of utmost importance given its role as a guide in the selection of projects or programs, including the choice of their timing and scale.

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[1] See, e.g., Larry A. Sjaastad and Daniel L. Wisecarver, "The Social Cost of Public Finance", *Journal of Political Economy* 85, No. 3 (May 1977), pp. 513-547.

[2] See, e.g., Agnar Sandmo and Jacques H. Dreze, "Discount Rates for Public Investment in Closed and Open Economies", *Economia*, XXXVIII, 152, (November 1971); Arnold C. Harberger, "On Measuring the Social Opportunity Cost of Public Funds" in *Project Evaluation: Selected Papers*, (Chicago: University of Chicago Press, 1972).

[3] As has been shown elsewhere, the weighted average approach and the approach by the time preference for consumption are similar, but the latter can lead to incorrect results in a number of situations. See, David Burgess, "Removing Some Dissonance from the Social Discount Rate Debate", University of Western Ontario, (June 2006).

The size of the discount rate has been a policy issue in Canada for many years. The debate has been primarily concerned with the empirical measurement of the economic opportunity cost of funds, and even that discussion has been focused on a relatively narrow range of values. The main purpose of this paper is to empirically reexamine what is the appropriate economic discount rate for Canada.

II.   Background

The weighted average concept has been used previously in the measurement of the economic opportunity cost of capital for Canada.[4] A 10 percent social opportunity cost of capital was first estimated using a detailed industrial data and macroeconomic environment over the period of 1965-69[5] and it was endorsed by the Treasury Board in 1976.[6] Jenkins subsequently refined the estimates and extended the time period of the data base on the rates of return from investment in Canada from 1965 to 1974, but reaffirmed his 10 percent estimate.[7]

Using the data for the same time period, the magnitude of the discount rate for Canada was questioned by Burgess for a variety of theoretical and empirical reasons. He suggested that the social opportunity cost of capital for Canada should be lowered to 7 percent real, due to a number of biases in the derivation of the 10 percent figure.[8] The main points of disagreement between Jenkins and Burgess lie in the use of different values for the parameters employed in the estimation of the economic opportunity cost of

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[4] See, e.g., Glenn P. Jenkins, Analysis of Rates of Return from Capital in Canada, unpublished Ph.D. Dissertation, University of Chicago, (1972); and "The Measurement of Rates of Return and Taxation from Private Capital in Canada", in W.A. Niskanen, et. al. (eds.), *Benefit-Cost and policy Analysis*, (Chicago: Aldine, 1973); David F. Burgess, "The Social Discount Rate for Canada: Theory and Evidence", *Canadian Public Policy*, (1981).
[5] Jenkins, ibid.
[6] Treasury Board Secretariat, *Benefit Cost Analysis Guide*, (Ottawa: Minister of Supply and Services Canada, 1976).
[7] Glenn P. Jenkins, *Capital in Canada: Its Social and Private Performance 1965-1974*, Economic Council of Canada, Discussion Paper No.98, (October 1977).
[8] David F. Burgess, "The Social Discount Rate for Canada: Theory and Evidence", *Canadian Public Policy*, (1981).

capital.[9] In particular, the issues were related to (a) relative contribution of foreign funding and its social opportunity cost, (b) the interest elasticity of domestic saving and its social cost, and (c) the distortions associated with labor, foreign exchange and subsidies in the Canadian economy. The difference between using a discount rate of 7 percent and 10 percent is not small and could easily lead to a different recommendation of whether to accept or reject a project when using the net present value criterion to measure the expected efficiency of the resources employed.

Subsequently, the social discount rate of 10 percent real was reviewed by Watson in 1992 and it was again recommended for use in Canada by the Treasury Board in 1998.[10] In 2004, the social or economic discount rate was re-estimated for Canada by Starzenski who found it to be a real rate of approximately 8 percent.[11] In 2005, Burgess also revisited his estimate of the social discount rate and proposed a rate of 7.3 percent using fairly aggregate economic data with alternative simulation scenarios.[12]

With the exception of Starzenski, the above empirical estimates were largely based on the data over the period 1965 to 1974. The effects of inflation and changes in business taxes and the structure of the Canadian economy since 1974 have not been fully taken into consideration. The estimation of the economic rates of return from investment that are derived from data for individual industries is a time consuming process. An alternative approach is to use aggregate national income accounts data to estimate the pre-tax returns of domestic investment, one of the key parameters in the estimation of the social discount rate.[13] For the other components of the discount rate, more recent data are also available and will be incorporated in the calculation of the social discount rate.

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[9] Glenn P. Jenkins, "The public-Sector Discount Rate for Canada: Some Further Observations", *Canadian Public Policy*, (1981).

[10] Kenneth Watson, "The Social Discount Rate", *Canadian Journal of Program Evaluation*, Vol. 7, No. 1, (1992); Treasury Board Secretariat, *Benefit Cost Analysis Guide*, (July 1998).

[11] Nahuel Arruda Starzenski, The Social Discount Rate in Canada: A Comprehensive Update, a M.A. thesis submitted to Queen's University, (November 2004).

[12] David F. Burgess, "An Update Estimate of the Social Opportunity Cost of Capital for Canada", University of Western Ontario, (March 2005).

[13] E.g., Arnold C. Harberger, "Private and Social Rates of Return to Capital in Uruguay", *Economic Development and Cultural Change*, (April 1977); Chun-Yan Kuo, Glenn P. Jenkins and M. Benjamin

III.   An Empirical Update

While Canada operates in a global capital markets, the intensity by which it finances its capital formation from abroad will affect the cost it pays for such funds. In such an economy, when funds are raised in the capital markets, the cost of funds will tend to rise. Because of the higher financial cost, the funds obtained to finance a project are normally diverted from three alternative sources. First, funds that would have been invested in other investment activities have now been postponed or displaced by the expenditures required to undertake the project. The cost of these funds for society as a whole is the gross-of-income tax return that would have been earned on the alternative investments in the economy. Second, funds would come from different categories of domestic savers who postpone their consumption in the expectation of getting a higher net of tax return now so that they can purchase additional consumption later. Third, some funds may be coming from abroad, that is from foreign savers. The cost of these funds should be measured by the marginal cost of foreign capital inflows. This parameter is estimated by the direct cost of the incremental funds to the users of these funds plus any effects the additional foreign financing has on the future financing cost of other foreign capital already in Canada.

The social or economic discount rate will be measured by a weighted average of the economic costs of funds from these three sources: the rate of return on postponed or displaced investment, the social cost of newly stimulated domestic savings, and the marginal cost of additional foreign capital inflows. The weights are equal to the proportion of funds sourced from domestic private-sector investors, domestic private-sector savers, and foreign savers. They should be measured by the reaction of investors and savers to a change in market interest rates brought about by the increase in government borrowing. This can be written as:

Mphahlele, "The Economic Opportunity Cost of Capital in South Africa", *the South African Journal of Economics*, Vol. 71:3, (September 2003).

$$\text{EOCK} = f_1\rho + f_2\, r + f_3\, (\text{MC}_f) \tag{1}$$

Where ρ stands for the gross-of-income tax return on domestic investments, r for the social cost of newly-stimulated domestic savings, and MC_f for the marginal cost of incremental capital inflows from abroad; f_1, f_2, and f_3 are the corresponding sourcing fractions associated with displaced investment, newly stimulated domestic savings, and newly stimulated capital inflows from abroad. Obviously, $f_1 + f_2 + f_3$ should equal one.

The weights can be expressed in terms of the elasticities of demand and supply yielding the following,

$$\text{EOCK} = \frac{\varepsilon_r\left(S_r/S_t\right)*\gamma + \varepsilon_f\left(S_f/S_t\right)*\text{MC}_f - \eta\left(I_t/S_t\right)*\rho}{\varepsilon_r\left(S_r/S_t\right) + \varepsilon_f\left(S_f/S_t\right) - \eta\left(I_t/S_t\right)}$$

$$\tag{2}$$

where ε_r is the supply elasticity of domestic savings, ε_f is the supply elasticity of foreign funds, η is the elasticity of demand for domestic investment with respect to changes in the cost of funds, S_t is the total private-sector savings available in the economy, of which S_r is the contribution to the total savings by residents, S_f is the total contribution of net foreign capital inflows, and I_t is the total private-sector investment.

We begin by estimating the economic cost of each alternative source of funds in equation (1). It will be expressed as a percentage of the respective stock of reproducible capital.

(a) The Gross-of-Tax Return to Domestic Investment

In this study, the rate of return on domestic investment is calculated based on the country's national income accounts. This is a comprehensive account of the full range of economic activities in the country. It covers not only manufacturing and non-manufacturing sectors but also the imputed rents for owner-occupied houses.

The economic return of capital on domestic investment is the contribution of capital to the economy as a whole, which can be measured by the sum of the private net-of-tax returns on capital and all direct and indirect taxes generated by this capital. There are alternative ways of estimating this gross-of-tax return to a country's reproducible capital. Our approach is to sum all the returns to capital and then divided the total by the value of the stock of reproducible capital including buildings, machinery and equipment. The return on capital consists of the sum of interest, rent and profit incomes that are recorded in the national accounts. However, some items, such as the surplus of unincorporated enterprises, do not separate out the return to capital explicitly. These are mainly small businesses and farm operations. Because the owners of the businesses and their family members are also workers and are often not formally paid with wages, the operating surplus of this sector includes the returns to both capital and labor. In this study, the labor content of this mixed income is assumed to be approximately 70 percent of the total. This is approximately labor's overall share of total value added for the economy.

Taxes include corporate income taxes, property taxes as well as the share of sales and excise taxes attributed to the value added of reproducible capital. In the case of sales tax, if it is a consumption-type value-added tax, the tax is applied to the sales of goods and services at all stages of the production and distribution chain. At each stage, vendors are able to claim tax credits to recover the tax they paid on their business inputs, including capital goods such as machinery, equipment and building. As a result, the value-added tax is not embodied in the value added of capital; it is effectively borne by labor. In 1991 Canada introduced a federal Goods and Services Tax (GST) at a rate of 7 percent to replace the manufacturer's sales tax.[14] At the same time, the Government of Quebec also replaced its retail sales tax by the same GST at 8 percent. Later on April 1, 1997, the provincial retail sales taxes in Nova Scotia, New Brunswick, and Newfoundland and Labrador were also replaced and harmonized with the federal GST at a single rate of 15 percent to the same base of goods and services.[15]

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[14] Department of Finance Canada, *Goods and Services Tax – Technical Paper*, (August 1989). The current government lowered the GST rate to 6 percent now.
[15] The Governments of Canada, Nova Scotia, New Brunswick, Newfoundland and Labrador, Harmonized Sales Tax, Technical Paper, (Ottawa: Department of Finance).

In addition, there has been a considerable amount of the federal and provincial excise taxes and duties that are imposed on alcoholic beverages, tobacco products, motor vehicle fuels, and so on. These taxes are mainly levied on consumer goods. Excise taxes on business inputs such as fuels, are not creditable in the same way as is the GST paid on the purchase of inputs. The share of these excise taxes that are a component of the value added of capital needs to be estimated and included in the return to reproducible capital.

The value of the stock of reproducible capital excludes the value of land, so the income stream accruing to capital we should also exclude the portion that is attributable to the unimproved land. This is significant only in the cases of agriculture and housing. However, all improvements to land, like clearing, leveling, installation of infrastructure for utilities, fencing, irrigation, and drainage should be considered part of reproducible capital. Thus the share of unimproved land in the total capital stock is quite small. The precise data on the contribution of land are not readily available. From the analysis of farm budgets it is estimated that for Canada approximately 25 percent of the total value added of the agricultural sector could be attributed to land. In the case of the housing sector, information is not available on the value of land embodied in this sector, nor is the land component of the value added available for the sector. In the estimates of the total return to capital in the economy the value of imputed rent on owner-occupied houses is included. However, the value of imputed rent excludes the contribution of land to the value added of the housing sector. By excluding from the income to capital the contribution of land in residential housing, we are able to derive the rate of return to reproducible capital alone.

To calculate the rate of return on reproducible private-sector capital, we use the values for the year-end residential and non-residential capital stock estimated by Statistics Canada. These values are derived by breaking down investment into its components such as buildings, machinery, and equipment. Different depreciation rates are applied yearly to the cumulated value of the stock of the capital for each of these categories while the value of the stock is augmented by the value of new gross investment made each year. The time

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path of capital stock, appropriate depreciation rates and new investment by categories are estimated for individual sectors to arrive the year-end values for the net capital stock.[16] Given the year-end net capital stocks, we can calculate the mid-year fixed capital stocks. We include in the stock of reproducible capital the value of the investment made by Canadian public-sector enterprises that operate as business firms. However, we exclude the capital used in the general public administration from the capital base since this part of the public sector involves activities such as public security, national defense, and public administration for which no valuation is made in the national accounts for the services they produce. Investment in these types of operations would generally not be affected by government borrowing in the capital markets. The figures are deflated by the GDP deflator and expressed in 1997 prices.

The detailed computations for the estimation of the gross-of-tax rate of return on domestic investments are presented in Table 1. For the past 40 years, the average real rate of return on investment (ρ) in Canada has been about 12.70 percent in 1966-75, 13.00 percent in 1976-85, 11.32 percent in 1986-95, and 11.77 percent in 1996-2005. The rate of return ranges from 10.00 to 14.00 percent over these years with the exception of the recession years of 1991 and 1992. For the purpose of this analysis, we use 11.5 percent as the value of the rate of return on domestic investment for the estimation of the EOCK.

(b) The Cost of Newly Stimulated Domestic Savings

When new project funds are raised in a country's capital market, it will result in an increase in the cost of funds that in turn stimulates additional private-sector savings. This additional savings comes at the expense of postponed consumption that has an average opportunity cost equal to the return obtained from the additional savings, net of all taxes and financial intermediation costs.

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[16] See, e.g., Kuen H. Huang, "The Method of the Quarterly Capital Stock Estimation and User Cost of Capital", paper prepared for Investment and Capital Division, Statistics Canada, (December 2004).

The opportunity cost of the newly stimulated domestic savings can therefore be measured by the gross-of-tax return to reproducible capital minus the amount of corporate income taxes paid directly by business entities, and the property taxes paid by these entities and homeowners. It is further reduced by the personal income taxes that are paid on the income generated from reproducible capital. This net-of-tax income received by individual owners of capital is further reduced by the costs of financial intermediations provided by banks and other deposit-taking institutions. These intermediation costs are one of the components that create a gap between the gross of tax return to investment and the net of tax return to savings. The final result is the net return on domestic savings. It also reflects the rate of time preference of individuals for consumption forgone.

Our empirical estimation of this parameter starts with the gross-of-tax return to reproducible capital generated in the previous section. As was shown in Table 2, the gross-of-tax return is reduced by the amounts of corporate income taxes and the property taxes paid by corporations and homeowners, as well as imputed rents for owner-occupied housing to arrive at the net-of-capital tax return to reproducible capital in the non-housing sector. The estimate is further reduced by the amount of the personal income tax on these capital incomes as well as intermediation services charged by financial institutions in order to derive the net return to domestic savings.

It should be noted that we estimate the costs of financial intermediation services provided by banks, trust companies, credit unions and other deposit-taking institutions by deducting the total payments to labor as part of the general deduction for the value added of labor and deducting the value of gross profits for the sector. The depreciation component of the gross value added of the financial sector has already been deducted in the calculation of net after tax profits, hence, only the net profits of the financial sector needs to be deducted. Overtime, the proportion of these intermediation services that are charged for through the levy of fees has been increasing. For the purpose of this exercise, the financial intermediation services are assumed to account for 50 percent of the total net-of-tax profits in deposit-taking institutions. To estimate the net return to newly domestic savers, one has to further subtract personal income taxes on capital income. Due

to lack of data on taxes paid by savers exclusively on their capital income, we are making the estimation based on the assumption that income taxes on the income from capital are the same effective tax rate as income taxes on wages and salaries. This assumption might bias downward the amount of taxes paid on the income from capital as investors tend to be relative wealthy and are likely to be at a higher marginal rate of personal income tax than are wage earners. With these assumptions, we can estimate the annual amount of the personal income tax on capital.

The rate of time preference for consumption can then be estimated by dividing the estimated net return income accruing to domestic savings by the stock of reproducible capital. This is presented in the last column of Table 2. Over the past 30 years, the economic cost of newly stimulated domestic savings for Canada would be on average 5.62 percent in 1976-85, 3.91 percent in 1986-95 and 4.02 percent in 1996-2005. For the purpose of this analysis, we use 4 percent as the value of r in the estimation of the EOCK. It is an average rate of time preference.

(c) Marginal Economic Cost of Foreign Financing

The last component of the EOCK arising from the raising of funds in the capital markets is the marginal economic cost of newly-stimulated capital inflows from abroad. Foreign capital inflows reflect an inflow of savings from foreigners which augments the resources available for investment. When the demand for investible funds is increased, the market interest rates are increased to attract funds and an additional cost is created in the case of foreign borrowing. As the quantity of foreign obligations rises relative to the country's capacity to service these foreign obligations, one would expect the return demanded by foreign investors to rise. For the country as whole, the cost of foreign borrowings is not just the cost of serving the additional unit of foreign fund but also the extra financial burden on all other borrowings that are responsive to the market interest rate. As a consequence, the marginal cost of additional foreign borrowing increases as the proportion of the country's capital stock that is financed from foreign sources increases.

The marginal economic cost of foreign borrowing (MC$_f$) can be expressed as follows:

$$MC_f = i_f \times (1 - t_w) \times \{1 + \phi \times (1/\varepsilon_s^f)\} \qquad (3)$$

where i_f is the real interest rate on foreign borrowing by the project, t_w is the rate of withholding taxes charged on interest payments made abroad, ϕ is the ratio of [the total foreign financing whose interest rate is flexible and will respond to additional foreign borrowing] to [the total amount of foreign borrowing and foreign direct investment], ε_s^f is the supply elasticity of foreign funds to a country with respect to the interest rate the country pays on its incremental foreign capital flows.

The Canadian capital markets are highly integrated with the rest of the world, especially with the United States. The real rate of return on total U.S. direct investment net of any withholding tax that is either repatriated to the U.S. or reinvested in Canada was estimated to average 6.11 percent from 1964 to 1973.[17] The cost of the U.S. foreign investment in Canada was subsequently re-estimated by Evans and Jenkins over the period from 1951-1978.[18] They found that the net income received and accrued by the U.S. owners of direct investment in Canada ranged from 5.75 percent to 6.03 percent. No further update has been made in recent years. For the purpose of this analysis, 6 percent will be assumed for the average rate of return for non-resident owners of investment in Canada.

It is also reasonable to assume that about thirty percent of foreign investment in Canada is represented by variable interest rate loans and thus ϕ is taken as .3. The supply curve of funds facing a country would generally be upward sloping. If we assume an elasticity of supply at 3.0, the marginal cost of foreign capital inflow would be about 6.60 percent.[19]

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[17] Glenn P. Jenkins, Capital in Canada: Its Social and Private Performance, 1965-1974, Economic Council of Canada, Discussion Paper No. 98, (October 1977).

[18] John C. Evans and Glenn P. Jenkins, "The Cost of U.S. Direct Foreign Investment", Harvard Institute for International Development, Development Discussion Paper No. 104, (November 1980).

[19] The elasticity of supply of foreign funds investment is measured with respect to changes in the stock of foreign investment for changes in the return to foreign investment.

As our estimate of the marginal cost of foreign financing including only the cost of servicing Canada's direct investment, both debt and equity, and not the portfolio investment in Canada that might cost less, our estimated cost of foreign financing might be biased upward. To adjust for this bias we assume that the marginal cost of all foreign financing in Canada to be approximately 6 percent.

(d) Measurement of the EOCK

As was mentioned earlier, the economic opportunity cost of capital is estimated as the weighted average of the gross-of-tax rate of return on domestic investment, the cost of newly stimulated domestic savings, and the marginal cost of newly induced foreign capital inflows as shown in equation (2). The marginal cost for each of the three components was estimated in the previous sub-sections. The weights associated with each source of funding at the margin depends upon the average contributions made from each source and their responses to the change in interest rate as a result of borrowing in the capital market.

The annual gross fixed investments made by private corporations and public corporations and general public administration services are shown in Table 3. Over the past 40 years, the contribution by the general public administration services has accounted for an average of 21.73 percent of national gross investment. This share, however, has declined to an average of 19.74 percent over the past 20 years and to 17.56 percent over the past 10 years. This is consistent with the cumulated reproducible capital used to calculate the rate of return on domestic investment and the cost of newly stimulated domestic savings.

Over the years the private-sector investment in Canada has been financed by private-sector savings. The situation has been quite different for the public sector. The Government of Canada was in deficit in 1980s and for a period the deficit was as high as one-third of the national budget. The fiscal situation later improved and in recent years the federal government has been running a surplus. As of January 31, 2007, the federal debt was approximately $526,697 million, which accounts for almost 35 percent of GDP.

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If the debt is expressed as the percentage of the current private- and public-sector reproducible capital, it would be about 11.7 percent.[20] In other words, investment by the general public administration has been financed in part by private-sector savings. For the purpose of this analysis, the ratio of the private-sector investments to the private-sector savings from residents and non-residents (I_t/S_t) is set at 0.9 in the base case. Taking into account the debt held by provincial and municipal governments, this ratio could be slightly lower.

During the period 1947 to 1973, on average approximately 20 percent of gross fixed capital formation in Canada was financed by foreign capital inflows. With the introduction of NAFTA in 1990 and the further integration of the Canadian capital markets with those of the rest of the world, one would expect a higher proportion of gross capital formation being financed by foreign savings.[21] For this analysis, we assume the percentage (S_f/S_t) to have increased to 25 percent. The remainder (S_r/S_t) will be financed by domestic savings.

Following equation (2), to estimate the weights assigned to each source of funding, we need to specify the elasticity of supply of each source with respect to the real cost of funds. The initial estimation is carried out using a value for the demand elasticity for domestic investment of -1.0, a supply elasticity of newly stimulated domestic savings of 0.4, and a supply elasticity of foreign savings of 3.0.[22] With these assumptions, the proportions of funds obtained from these three sources are 15.38 percent from domestic savings, 38.46 percent from foreign capital, and 46.16 percent from displaced or postponed domestic investment. Substituting these data into equation (2), one obtains a

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[20] This is calculated by the ratio of the federal debt, $527 billion, to the total national reproducible capital, $4,500 billion, expressed in 2007 prices. See Table 1.

[21] In fact, more than 1.3 million corporations currently exist in Canada; of which about 8,000 are foreign controlled and account for 21.9 percent of the assets for the country as a whole.

[22] See, e.g., M.J. Boskin, "Taxation, Saving, and the Rate of Interest", *Journal of Political Economy*, (1978); G.P. Jenkins and M. Mescher, "Government Borrowing and the Response of Consumer Credit in Canada", paper prepared for Department of Regional Economic Expansion, (1981); D.M. Leipziger, "Capital Movements and Economy: Canada under a Flexible Rate", *Canadian Journal of Economics*, (February 1974).

base-case estimation of the economic opportunity cost of capital for Canada of 8.23 percent.

IV.   Sensitivity Analysis

The above empirical estimates depend upon the value of several key parameters such as the rate of return on domestic investment (ρ), the supply elasticity of foreign capital inflow (ε_f), the ratio of the private-sector investments to the private-sector savings from residents and non-residents (I_t/S_t), and time preference for consumption. In the sensitivity analysis, we assess the impact of changes in the value of these key parameters on our estimate of the economic opportunity cost of capital for Canada.

(a)   *The Rate of Return on Domestic Investment*

If the average rate of return on domestic investment is 0.5 percentage point lower than the base case, it would imply a value of 11 percent instead of 11.5 percent. With this value, the economic opportunity cost of capital for Canada is about 8.00 percent, 0.23 of one percentage point lower than the base case.

(b)   *The Supply Elasticity of Foreign Capital*

We have assumed a value of 3.0 in the base case for the supply elasticity of the stock of foreign savings to Canada. Suppose the elasticity of foreign capital is as high as 5.0 instead of 3.0 assumed earlier, the share of financing from foreign funds to investment projects will be much larger. The sourcing of funds would become 12.25 percent from domestic savings, 51.02 percent from foreign capital, and 36.73 percent from displaced or postponed domestic investment. As a result, the economic opportunity cost of capital decreases to 7.78 percent, or 0.45 of one percentage point lower than the estimate for the base case.

(c)   *The Ratio of the Private-Sector Investments to the Private-Sector Savings*

As was discussed earlier, the 90 percent ratio for the private-sector investments to the private-sector savings was based on the federal debt alone. If the debt for the provincial and municipal governments is also taken into account, the 90 percent share could go down to 80 percent. Let us assume the ratio of I_t/S_t is 80 percent. The proportions of funds diverted to finance the investment project would become 16.22 percent from newly stimulated domestic savings, 40.54 percent from foreign savings, and 43.24 percent from displaced or postponed domestic investment. As a consequence, the economic opportunity cost of capital would decrease to 8.05 percent.

On the contrary, as the federal and several provincial governments have in recent years exhibited budget surplus, we may assume the ratio of I_t/S_t would be equal to unity. In this scenario, the sourcing of funds directed from the private sectors to the government borrowing would be 14.63 percent from domestic savings, 36.59 percent from foreign capital inflow, and 48.78 percent from displaced or postponed domestic investment. This suggests that the economic opportunity cost of capital would rise to 8.39 percent, approximately 0.16 of one percentage point higher than the base case.

(d)   *Time Preference for Consumption*

The time preference for consumption is measured by the cost of newly stimulated domestic savings. The 4 percent estimate was based on average rate over the past 25 years. As a matter of fact, it has been declining over years. In the past 15 years, it was averaged at 3.55 percent. Suppose it is 3.0 percent instead of 4 percent assumed for the base case, the economic opportunity cost of capital would become 8.08 percent, about 0.15 of one percentage point lower than the base case.

From the above sensitivity analyses, we find that the economic opportunity cost of capital ranges from 7.78 percent to 8.39 percent. We can conclude that a conservative estimate of the economic opportunity cost of capital for Canada would be a real rate of 8.00 percent.

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V. Concluding Remarks

The economic or social discount rate is a key parameter used for investment decision-making. The value of this variable has been controversial and debated for years. The issue is even more critical when applied to the social sector projects and programs such as health, education, environment and regulations.

This paper has reviewed some theoretical issues and described a practical framework for the estimation of the economic cost of capital for Canada. It is in the framework of a small open economy in both commodity and capital markets. When funds are raised in the capital markets for use in an investment project, these funds are obtained from three sources: displacement or postpone of private domestic investment, newly stimulated domestic savings, and newly stimulated inflows of capital from abroad. Employing this framework, we estimate that the real economic opportunity cost of capital would be approximately 8.23 percent in the base case.

We have preformed a sensitivity analysis by allowing the key parameters that have an impact on the measurement of the economic discount rate. These parameters include the rate of return on domestic investment, the supply elasticity of foreign capital inflows, the ratio of the total private investment to the total private savings, and the time preference for consumption. The results suggest that estimates of the discount rate can range from 7.78 percent to 8.39 percent real. As a consequence, we conclude that for Canada an 8 percent real rate is an appropriate discount rate to use when calculating the economic net present value of the flows of economic benefits and costs over time.

Table 1   Return to Domestic Investment 1965-2005

Year	Corporation Profits before Income Taxes	Public Enterprise Profits before Income Taxes	Interest and Other Investment Income	Accrued Net Income of Farming	Net Income of Non-Farming	Gross Imputed Rent	Real Property Taxes	Gross-of-Tax Income to Capital without Having Indirect Taxes
				(millions of dollars)				
1965	6,543	453	1,917	1,450	4,185	3,318	2,024	15,837
1966	7,031	424	2,130	2,000	4,391	3,598	2,250	17,200
1967	7,211	486	2,360	1,272	4,671	3,988	2,478	18,211
1968	8,079	514	2,796	1,367	5,112	4,442	2,771	20,443
1969	8,579	673	3,158	1,503	5,505	4,911	3,074	22,385
1970	8,089	771	3,493	1,342	5,721	5,466	3,315	23,152
1971	9,092	786	3,959	1,442	6,116	5,983	3,537	25,516
1972	11,237	857	4,700	1,349	6,529	6,463	3,839	29,358
1973	15,939	949	5,845	2,828	7,076	7,081	4,129	36,702
1974	20,738	1,241	8,594	3,593	7,331	7,982	4,600	46,163
1975	20,220	1,153	10,407	3,731	8,149	9,348	5,314	49,726
1976	21,009	1,658	12,961	3,111	9,077	11,234	6,366	56,651
1977	21,922	2,148	15,489	2,420	10,139	13,486	7,253	63,884
1978	26,409	2,694	18,877	3,015	11,573	15,642	7,937	75,709
1979	34,927	3,895	23,185	3,103	12,744	17,498	8,260	92,286
1980	38,382	4,334	27,256	3,167	13,585	19,818	9,436	104,014
1981	35,831	4,954	33,277	2,823	14,680	22,794	10,706	112,601
1982	26,697	2,509	37,991	2,191	16,984	25,818	11,500	110,103
1983	36,730	4,432	37,062	1,827	20,901	28,798	12,232	125,935
1984	45,686	4,936	39,618	2,099	23,473	31,197	13,050	142,001
1985	49,728	4,937	40,763	2,839	25,904	33,667	13,897	151,402
1986	45,217	4,564	39,481	3,825	28,574	36,686	15,024	150,405
1987	57,888	5,126	38,841	1,985	30,761	39,963	16,286	167,779
1988	64,891	6,829	42,188	3,283	33,113	43,898	17,675	186,154
1989	59,661	7,246	48,013	1,986	34,856	48,658	19,534	194,016
1990	44,936	6,460	54,874	2,053	35,544	52,709	21,304	191,408
1991	32,920	5,179	54,486	1,853	37,022	56,509	22,974	183,592
1992	32,648	5,993	52,742	1,727	39,406	59,950	24,604	188,147
1993	41,102	4,694	52,381	2,017	42,068	62,758	25,512	199,521
1994	65,464	5,827	52,000	1,255	44,931	66,503	25,469	229,025
1995	76,270	6,709	50,981	2,702	46,363	69,449	25,737	243,663
1996	80,335	6,143	50,477	3,825	49,278	71,761	26,322	250,682
1997	87,932	6,653	48,881	1,663	54,663	74,080	27,125	261,444
1998	86,132	7,080	47,134	1,724	57,936	76,788	28,795	263,698
1999	110,769	8,401	47,249	1,819	61,466	79,346	29,809	294,423
2000	135,978	11,329	55,302	1,243	64,944	82,586	29,898	334,856
2001	127,073	10,787	52,579	1,675	68,857	86,014	30,721	328,208
2002	135,229	11,661	46,693	1,101	74,292	90,313	31,461	337,892
2003	144,821	12,290	49,679	1,373	77,014	94,459	33,557	358,219
2004	171,323	12,508	54,084	3,256	80,828	99,112	35,442	397,450
2005	189,455	14,481	60,403	1,706	84,500	103,713	37,106	430,892

Table 1 Return to Domestic Investment, 1965-2005 (Cont'd)

Year	Gross-of-Tax Income to Capital without Having Indirect Taxes	Labor Income of Incorporated	Total Labor Income including unincorporated Businesses	Federal Manufacturer's Sales Tax	Federal Goods and Services Tax	Federal Excise Taxes	Provincial Retail Sales Tax	Provincial Goods and Services Tax	Provincial Excise Taxes	Gross-of-Tax Income to Capital Taking into Account Indirect Taxes
					(millions of dollars)					
1965	15,837	29,630	33,575	1,343		2,560	818		1,030	17,680
1966	17,200	33,507	37,981	1,468		2,788	1,000		1,168	19,203
1967	18,211	37,065	41,225	1,580		2,923	1,252		1,251	20,357
1968	20,443	40,297	44,832	1,580		2,997	1,414		1,463	22,778
1969	22,385	45,065	49,971	1,712		3,182	1,678		1,625	24,921
1970	23,152	48,851	53,795	1,696		3,214	1,832		1,794	25,721
1971	25,516	53,556	58,847	1,912		3,533	1,989		1,933	28,349
1972	29,358	60,108	65,623	2,246		3,970	2,320		2,177	32,670
1973	36,702	69,243	76,176	2,496		4,510	2,894		2,400	40,701
1974	46,163	82,571	90,218	2,962		6,699	3,603		2,598	51,532
1975	49,726	96,305	104,621	2,971		6,042	3,655		2,784	54,704
1976	56,651	111,413	119,945	3,911		6,503	4,661		3,152	62,498
1977	63,884	123,390	132,181	4,284		6,718	5,034		3,523	70,257
1978	75,709	134,216	144,428	4,766		6,984	4,773		3,700	82,664
1979	92,286	150,946	162,039	4,593		7,136	5,812		3,971	100,092
1980	104,014	170,643	182,369	5,173		8,007	6,366		4,410	112,715
1981	112,601	196,716	208,968	6,279		10,276	7,270		5,288	122,795
1982	110,103	210,083	223,506	5,926		10,118	7,844		6,481	120,126
1983	125,935	220,283	236,193	6,491		10,022	9,166		7,111	137,339
1984	142,001	237,248	255,148	7,434		10,867	10,454		7,613	155,005
1985	151,402	255,825	275,945	9,096		12,736	11,816		8,195	166,226
1986	150,405	272,755	295,434	11,841		16,128	13,198		8,853	167,279
1987	167,779	296,442	319,364	12,726		18,508	14,548		9,460	186,805
1988	186,154	325,250	350,727	14,329		20,303	16,925		10,277	207,593
1989	194,016	350,743	376,532	16,253		23,188	18,468		10,930	217,424
1990	191,408	368,891	395,209	14,288		21,577	18,668		11,383	212,916
1991	183,592	379,092	406,305		17,379	25,295	14,412	4,280	11,653	199,576
1992	188,147	387,788	416,581		17,786	25,655	13,066	5,519	12,671	204,137
1993	199,521	394,816	425,676		18,153	26,346	13,386	5,488	13,383	216,472
1994	229,025	404,918	437,248		19,058	25,434	15,347	5,099	13,928	247,830
1995	243,663	418,825	453,171		19,650	26,810	16,357	4,964	14,673	263,888
1996	250,682	428,792	465,964		20,613	28,022	16,008	5,137	15,343	271,451
1997	261,444	453,073	492,501		22,559	30,566	15,921	6,113	16,528	283,296
1998	263,698	474,335	516,097		23,159	31,443	17,481	6,100	17,678	286,220
1999	294,423	502,726	547,026		25,053	33,339	18,477	7,065	18,817	319,138
2000	334,856	545,204	591,535		27,090	35,369	19,994	7,388	19,389	361,876
2001	328,208	570,008	619,380		27,915	36,487	20,108	8,092	20,482	354,904
2002	337,892	593,307	646,082		30,072	39,417	21,014	8,284	22,244	366,283
2003	358,219	621,003	675,874		31,564	41,247	21,498	9,044	23,355	388,045
2004	397,450	651,888	710,747		32,989	42,594	21,999	9,795	24,613	429,443
2005	430,892	688,150	748,494		34,819	44,541	23,234	10,186	25,519	464,977

Table 1   Return to Domestic Investment 1965-2005 (Cont'd)

Year	Gross-of-Tax Income to Capital Taking into Account Indirect Taxes	GDP Deflator [1997=100]	Real Gross-of-Tax Income to Capital Taking into Account Indirect Taxes [$1997]	Year-End Real non-residential capital stock [$1997]	Year-End Fixed Residential Capital Stock [$1997]	Year-end Capital Stock for Public Administration [$1997]	Year-End Real Capital Stock net of Public Administration [$1997]	Mid-Year Real Capital Stock net of Public Administration [$1997]	Real Rate of Return to Capital (%)	10-Year Average return to Capital (%)
					(millions of dollars)					
1965	17,680	18.51	95,516	666,687	219,181.20	150,265	735,604	367,802	12.98	
1966	19,203	19.42	98,881	705,683	228,048.40	157,582	776,149	755,876	12.74	
1967	20,357	20.29	100,331	742,946	237,090.80	164,821	815,216	795,682	12.31	
1968	22,778	21.13	107,798	777,811	248,029.10	171,807	854,033	834,624	12.62	
1969	24,921	22.16	112,458	812,671	261,240.00	179,098	894,813	874,423	12.57	
1970	25,721	23.13	111,200	849,038	272,873.10	186,137	935,774	915,293	11.88	
1971	28,349	24.25	116,905	886,412	287,027.30	194,296	979,143	957,459	11.94	
1972	32,670	25.68	127,218	923,433	302,687.20	202,957	1,023,163	1,001,153	12.43	
1973	40,701	28.17	144,485	963,977	319,468.80	211,312	1,072,133	1,047,648	13.48	
1974	51,532	32.45	158,804	1,007,225	336,657.70	219,596	1,124,286	1,098,210	14.12	
1975	54,704	35.92	152,295	1,053,439	352,712.00	228,175	1,177,976	1,151,131	12.93	12.70
1976	62,498	39.33	158,907	1,097,450	373,358.60	236,030	1,234,778	1,206,377	12.87	
1977	70,257	42.01	167,239	1,141,524	393,621.70	243,996	1,291,150	1,262,964	12.95	
1978	82,664	44.78	184,601	1,185,390	413,377.40	251,526	1,347,241	1,319,195	13.70	
1979	100,092	49.25	203,233	1,235,370	432,013.40	258,506	1,408,877	1,378,059	14.43	
1980	112,715	54.21	207,923	1,292,781	447,951.20	265,154	1,475,579	1,442,228	14.09	
1981	122,795	60.05	204,489	1,360,731	465,828.40	272,848	1,553,712	1,514,645	13.16	
1982	120,126	65.15	184,384	1,416,399	479,168.30	280,298	1,615,270	1,584,491	11.42	
1983	137,339	68.69	199,940	1,462,207	496,570.60	287,128	1,671,650	1,643,460	11.96	
1984	155,005	70.94	218,501	1,506,562	513,844.00	294,507	1,725,899	1,698,774	12.66	
1985	166,226	73.14	227,271	1,553,298	533,011.00	302,708	1,783,601	1,754,750	12.74	13.00
1986	167,279	75.36	221,973	1,596,208	556,010.30	310,079	1,842,139	1,812,870	12.05	
1987	186,805	78.83	236,972	1,641,104	584,993.20	317,547	1,908,550	1,875,345	12.42	
1988	207,593	82.37	252,025	1,695,129	613,797.50	324,878	1,984,048	1,946,299	12.70	
1989	217,424	86.11	252,496	1,751,518	643,943.40	332,894	2,062,567	2,023,308	12.24	
1990	212,916	88.84	239,662	1,803,230	670,133.50	341,025	2,132,338	2,097,453	11.24	
1991	199,576	91.47	218,188	1,847,236	689,164.00	348,658	2,187,742	2,160,040	9.97	
1992	204,137	92.67	220,284	1,881,169	710,008.80	356,018	2,235,160	2,211,451	9.86	
1993	216,472	94.01	230,265	1,911,096	728,755.60	362,573	2,277,279	2,256,219	10.11	
1994	247,830	95.09	260,627	1,947,075	748,568.20	369,714	2,325,930	2,301,604	11.21	
1995	263,888	97.24	271,378	1,984,251	762,478.50	376,870	2,369,860	2,347,895	11.45	11.32
1996	271,451	98.81	274,720	2,023,949	778,242.90	383,010	2,419,182	2,394,521	11.36	
1997	283,296	100	283,296	2,079,298	797,597.00	387,625	2,489,270	2,454,226	11.38	
1998	286,220	99.57	287,456	2,138,742	815,621.80	391,608	2,562,756	2,526,013	11.22	
1999	319,138	101.31	315,011	2,206,295	834,388.70	395,686	2,644,997	2,603,877	11.91	
2000	361,876	105.5	343,010	2,277,928	855,170.80	400,859	2,732,239	2,688,618	12.55	
2001	354,904	106.68	332,681	2,348,605	879,570.80	407,521	2,820,655	2,776,447	11.79	
2002	366,283	107.82	339,717	2,411,844	909,665.60	414,620	2,906,889	2,863,772	11.69	
2003	388,045	111.45	348,179	2,482,241	942,421.30	421,624	3,003,039	2,954,964	11.59	
2004	429,443	114.77	374,177	2,559,240	978,687.30	428,817	3,109,111	3,056,075	12.03	
2005	464,977	118.46	392,518	2,646,432	1,015,901.50	436,909	3,225,425	3,167,268	12.17	11.77

Table 2 Return to Domestic Savings, 1965-2005

Year	Gross-of-Tax Income to Capital without Taking into account Indirect Taxes	Corporate Income Tax	Real Property Taxes	Total Personal Income Taxes	Total Labor Income including unincorporated Businesses	Estimated Personal Income Taxes Paid on Capital Income	Gross Imputed Rents for homeowner	Net Profits after Taxes for Deposit-Taking Institutions	Return to Domestic Savings	GDP Deflator [1997=100]	Mid-Year Real Capital Stock net of Public Administration [$1997]	Real Return to Domestic Savings (%)	
					(millions of dollars)							(%)	
1965	15,837	2,197	2,024	3,563	33,575	1,029	3,318	166	7,185	18.51	717,574	5.41	
1966	17,200	2,355	2,250	4,114	37,981	1,156	3,598	186	7,748	19.42	755,876	5.28	
1967	18,211	2,396	2,478	5,106	41,225	1,416	3,988	210	7,828	20.29	795,682	4.85	
1968	20,443	2,852	2,771	6,145	44,832	1,732	4,442	250	8,521	21.13	834,624	4.83	
1969	22,385	3,221	3,074	7,697	49,971	2,134	4,911	303	8,894	22.16	874,423	4.59	
1970	23,152	3,070	3,315	9,069	53,795	2,465	5,466	334	8,669	23.13	915,293	4.09	
1971	25,516	3,346	3,537	10,417	58,847	2,851	5,983	374	9,613	24.25	957,459	4.14	
1972	29,358	3,920	3,839	11,611	65,623	3,244	6,463	426	11,680	25.68	1,001,153	4.54	
1973	36,702	5,079	4,129	13,618	76,176	3,995	7,081	540	16,148	28.17	1,047,648	5.47	
1974	46,163	7,051	4,600	16,602	90,218	5,021	7,982	438	21,290	32.45	1,098,210	5.97	
1975	49,726	7,494	5,314	18,538	104,621	5,331	9,348	835	21,821	35.92	1,151,131	5.28	4.90
1976	56,651	7,128	6,366	21,400	119,945	6,254	11,234	940	25,199	39.33	1,206,377	5.31	
1977	63,884	7,238	7,253	23,811	132,181	7,143	13,486	1,169	28,180	42.01	1,262,964	5.31	
1978	75,709	8,188	7,937	24,728	144,428	7,878	15,642	1,220	35,455	44.78	1,319,195	6.00	
1979	92,286	10,038	8,260	27,774	162,039	9,351	17,498	995	46,642	49.25	1,378,059	6.87	
1980	104,014	12,078	9,436	32,139	182,369	10,772	19,818	1,399	51,211	54.21	1,442,228	6.55	
1981	112,601	12,796	10,706	38,565	208,968	12,465	22,794	2,188	52,746	60.05	1,514,645	5.80	
1982	110,103	11,755	11,500	43,098	223,506	13,169	25,818	2,108	46,807	65.15	1,584,491	4.53	
1983	125,935	12,320	12,232	45,667	236,193	14,832	28,798	2,347	56,580	68.69	1,643,460	5.01	
1984	142,001	14,984	13,050	48,721	255,148	16,193	31,197	2,292	65,431	70.94	1,698,774	5.43	
1985	151,402	15,563	13,897	53,262	275,945	17,570	33,667	2,476	69,467	73.14	1,754,750	5.41	5.62
1986	150,405	14,573	15,024	61,618	295,434	19,407	36,686	2,107	63,661	75.36	1,812,870	4.66	
1987	167,779	16,990	16,286	69,288	319,364	22,222	39,963	702	71,967	78.83	1,875,345	4.87	
1988	186,154	17,586	17,675	77,568	350,727	25,179	43,898	3,691	79,970	82.37	1,946,299	4.99	
1989	194,016	18,566	19,534	83,222	376,532	26,452	48,658	3,500	79,055	86.11	2,023,308	4.54	
1990	191,408	16,834	21,304	96,171	395,209	29,466	52,709	4,806	68,693	88.84	2,097,453	3.69	
1991	183,592	15,015	22,974	97,154	406,305	28,489	56,509	4,828	58,190	91.47	2,160,040	2.95	
1992	188,147	14,517	24,604	97,283	416,581	28,619	59,950	3,068	58,923	92.67	2,211,451	2.88	
1993	199,521	16,263	25,512	96,379	425,676	29,005	62,758	5,264	63,351	94.01	2,256,219	2.99	
1994	229,025	19,342	25,469	100,311	437,248	32,513	66,503	5,484	82,456	95.09	2,301,604	3.77	
1995	243,663	22,138	25,737	106,190	453,171	34,866	69,449	9,289	86,829	97.24	2,347,895	3.80	3.91
1996	250,682	26,239	26,322	113,608	465,964	36,933	71,761	9,494	84,680	98.81	2,394,521	3.58	
1997	261,444	32,250	27,125	120,790	492,501	38,360	74,080	11,325	83,966	100	2,454,226	3.42	
1998	263,698	30,800	28,795	128,935	516,097	40,092	76,788	8,447	82,999	99.57	2,526,013	3.30	
1999	294,423	39,410	29,809	134,197	547,026	42,669	79,346	9,960	98,209	101.31	2,603,877	3.72	
2000	334,856	48,175	29,898	143,951	591,535	46,991	82,586	11,303	121,555	105.5	2,688,618	4.29	
2001	328,208	36,352	30,721	145,926	619,380	46,738	86,014	10,277	123,244	106.68	2,776,447	4.16	
2002	337,892	35,746	31,461	138,655	646,082	44,181	90,313	11,650	130,366	107.82	2,863,772	4.22	
2003	358,219	39,158	33,557	139,301	675,874	44,672	94,459	14,022	139,362	111.45	2,954,964	4.23	
2004	397,450	44,132	35,442	150,813	710,747	50,077	99,112	16,687	160,344	114.77	3,056,075	4.57	
2005	430,892	48,514	37,106	165,983	748,494	56,123	103,713	17,306	176,783	118.46	3,167,268	4.71	4.02

Table 3 Gross Fixed Investment, 1965-2005

Year	The Amount of Investment				Percentage Distribution			
	Private Corporations	Public Corporations	Government Public Administrations	Grand Total	Private Corporations	Public Corporations	Government Public Administrations	Grand Total
			(millions of dollars)				(%)	
1965	6,352	1,640	2,804	10,796	58.84	15.19	25.97	100.00
1966	7,464	1,877	3,289	12,630	59.10	14.86	26.04	100.00
1967	6,423	1,997	3,457	11,877	54.08	16.81	29.11	100.00
1968	6,557	1,881	3,627	12,065	54.35	15.59	30.06	100.00
1969	8,106	1,977	3,553	13,636	59.45	14.50	26.06	100.00
1970	8,316	2,186	3,625	14,127	58.87	15.47	25.66	100.00
1971	9,034	2,304	4,292	15,630	57.80	14.74	27.46	100.00
1972	10,234	2,386	4,472	17,092	59.88	13.96	26.16	100.00
1973	12,532	3,419	4,454	20,405	61.42	16.76	21.83	100.00
1974	16,814	4,289	5,967	27,070	62.11	15.84	22.04	100.00
1975	15,341	6,475	7,035	28,851	53.17	22.44	24.38	100.00
1976	17,354	7,057	6,904	31,315	55.42	22.54	22.05	100.00
1977	17,414	8,499	7,925	33,838	51.46	25.12	23.42	100.00
1978	19,050	8,852	7,905	35,807	53.20	24.72	22.08	100.00
1979	28,424	9,180	8,406	46,010	61.78	19.95	18.27	100.00
1980	31,777	8,377	9,487	49,641	64.01	16.88	19.11	100.00
1981	40,694	11,507	10,987	63,188	64.40	18.21	17.39	100.00
1982	25,171	13,436	12,510	51,117	49.24	26.28	24.47	100.00
1983	30,022	12,797	12,269	55,088	54.50	23.23	22.27	100.00
1984	38,831	12,264	13,173	64,268	60.42	19.08	20.50	100.00
1985	44,024	11,500	15,470	70,994	62.01	16.20	21.79	100.00
1986	47,596	9,448	15,031	72,075	66.04	13.11	20.85	100.00
1987	56,700	8,696	15,534	80,930	70.06	10.75	19.19	100.00
1988	63,984	11,056	16,634	91,674	69.80	12.06	18.14	100.00
1989	68,776	11,862	18,989	99,627	69.03	11.91	19.06	100.00
1990	57,256	12,966	20,748	90,970	62.94	14.25	22.81	100.00
1991	49,164	13,639	21,047	83,850	58.63	16.27	25.10	100.00
1992	46,531	11,191	20,656	78,378	59.37	14.28	26.35	100.00
1993	51,671	9,542	19,887	81,100	63.71	11.77	24.52	100.00
1994	64,505	8,123	21,251	93,879	68.71	8.65	22.64	100.00
1995	74,645	9,117	21,661	105,423	70.81	8.65	20.55	100.00
1996	73,887	9,069	19,368	102,324	72.21	8.86	18.93	100.00
1997	100,411	7,376	20,317	128,104	78.38	5.76	15.86	100.00
1998	104,432	7,487	20,188	132,107	79.05	5.67	15.28	100.00
1999	113,938	6,937	20,133	141,008	80.80	4.92	14.28	100.00
2000	124,911	6,892	24,710	156,513	79.81	4.40	15.79	100.00
2001	109,581	7,967	27,448	144,996	75.58	5.49	18.93	100.00
2002	107,126	8,196	28,544	143,866	74.46	5.70	19.84	100.00
2003	114,078	9,350	30,100	153,528	74.30	6.09	19.61	100.00
2004	126,471	9,354	31,574	167,399	75.55	5.59	18.86	100.00
2005	140,884	12,513	34,264	187,661	75.07	6.67	18.26	100.00

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