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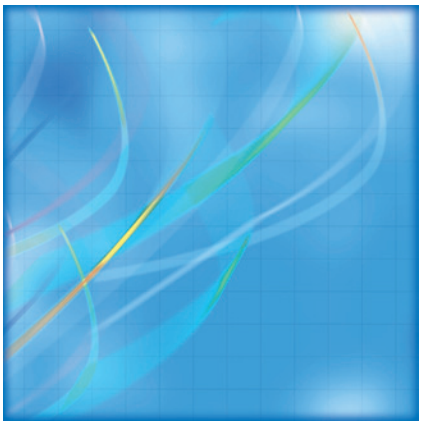
From Roads to Rinks: Government Spending on Infrastructure in Canada, 1961 to 2005



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Abstract

The overall growth of government-owned infrastructure has been very similar across most regions over the past 44 years. With the exception of the Atlantic Provinces, the range of average annual capital growth from one region to the next has been very narrow, falling between 1.8% and 2.2% since 1961, according to a new study released in September 2007 in the *Canadian Economic Observer.*

Since 2000, governments have increased their infrastructure capital more than at any time since the 1960s and 1970s. However, the growth has not been strong enough to prevent signs of wear in our infrastructure (the data are net of depreciation and in constant 1997 dollars). This is due to cuts in the 1990s when governments were grappling with significant budgetary deficits, as well as many of the assets built in the post-war infrastructure boom reaching the end of their life span.

This study analyses, from 1961 to 2005, government investment in infrastructure by different levels of government and type of asset by region.

Executive summary

The overall growth of government-owned infrastructure has been very similar across most regions over the past 44 years. With the exception of the Atlantic Provinces, the range of average annual capital growth from one region to the next has been very narrow, falling between 1.8% and 2.2% since 1961, according to a new study released in September 2007 in the *Canadian Economic Observer.*

However, the growth of infrastructure capital varied considerably by region for different periods, different levels of government and different types of assets.

Government-owned infrastructure capital constitutes an array of structures and networks that are needed for economic growth and are essential to our lifestyle. Its role is to enable people, goods and ideas to circulate or to ensure access to everyday essentials, such as good water, security and recreation facilities.

Since 2000, governments have increased their infrastructure capital more than at any time since the 1960s and 1970s. However, the growth has not been strong enough to prevent signs of wear in our infrastructure (the data are net of depreciation and in constant 1997 dollars). This is due to cuts in the 1990s when governments were grappling with significant budgetary deficits, as well as many of the assets built in the post-war infrastructure boom reaching the end of their life span.

Infrastructure growth differed across regions in terms of the type of assets. These differences were sharpened after 1980 when the funds available for infrastructure slowed. Every region showed differences in spending by asset type because their distinct economies, cultures and values had different needs and priorities: British Columbia focused on the environment, as well as recreation and engineering works in view of the upcoming Olympic Games; culture and security were a priority in Quebec; sports complexes, water and roads featured in Ontario; marine construction (such as irrigation) was given attention in the Prairies; and institutional buildings (such as training centres) featured in the Atlantic Provinces.

Roads and bridges made up the bulk (39.9%) of the government-owned stock of infrastructure. The stock of road infrastructure per capita increased significantly between 1960 and 1980, but has been eroding since then. Governments boosted the flow of investment in roads from $4.3 billion in 1998 to $7.3 billion in 2005, but this has barely offset the ongoing erosion of the road system.

Quebec's road capacity grew rapidly during the 1960s and 1970s, but also dominated the decline in subsequent years. Lower investment spending and steady depreciation resulted in a significant decline in its net capital stock in roads over the following two decades, far more than in any other part of the country. In terms of bridges and overpasses, Quebec invested so little that its capital stock fell in absolute terms, tumbling from the most in Canada in the late 1970s to approximately the same level as that in British Columbia and the Atlantic Provinces, and even below that in the Prairies. The average age of bridges and overpasses in Quebec has also risen constantly since 1976, becoming older than those of any of the other provinces. Since 2001, its capital stock in roads has started to recover slowly.

Ontario was the only part of the country where the capital stock in roads continued to rise throughout all four decades. The Atlantic Provinces stood out as strong investors in their road system, perhaps because of the importance of tourism. Their per capita road infrastructure was well ahead of the other regions.

British Columbia had the most government-owned infrastructure per capita related to the environment, while Quebec had the least. The Atlantic Provinces invested the most in waste management per capita.

Sports facilities and cultural capital were the asset types that increased the fastest in percentage terms, rising 3.7% and 3.8% respectively per year from 1961 to 2005. Overall, however, sports facilities represented a relatively small portion (5.5%) of total infrastructure capital. The dollar amounts were higher out West, reflecting recent events such as the 1988 Olympic Games in Calgary. Moreover, the Vancouver Games have already started to boost spending in British Columbia.

From 1961 to 2005, culture was (with office buildings) the only area of government investment for which Quebec was well ahead of the growth in government-owned capital infrastructure in the rest of the country. Quebec increased its investments in cultural facilities much more than in sports facilities, the opposite of most other regions in Canada. Nonetheless, culture was only a small share of government-owned capital in Quebec, as elsewhere. Culture capital for public libraries, museums, theatres and historical sites was approximately $100 per capita (in 1997 dollars). After 2000, the growth of culture capital fell behind roads in Quebec.

Security-related assets include penitentiaries, detention homes and courthouses. They represented only 3.1% of the value of total government-owned infrastructure. However, for all provincial and federal governments combined, security-related capital has been the third largest contributor to overall growth since 1961, after roads and office towers.

1. Introduction

Government-owned infrastructure capital constitutes an array of structures and networks that is the foundation for many human and material activities that are needed for economic growth and are essential to our lifestyle.[1] Its role is to enable people, goods and ideas to circulate or to ensure access to everyday essentials, such as good water, security and recreation facilities.

Since infrastructure is so fundamental to our society, it is not surprising that media attention in recent years has been focused on the collapse of bridges and overpasses and the rupture of water mains in Canada and the United States. This study analyses, from 1961 to 2005, government investment in infrastructure by different levels of government and type of asset by region.[2]

The overall growth of government-owned infrastructure[3] has been very similar across most regions over the past 44 years. With the exception of the Atlantic Provinces, the range of average annual capital growth from one region to the next is very narrow, falling between 1.8% and 2.2%[4] since 1961.

However, the growth of infrastructure capital varies considerably by region for different periods, different levels of government and different types of assets. The differences in provincial economies, cultures and values reflect specific needs and priorities for each region. Demographics, resources, economic conditions and special events (such as the Olympics) have also played a role in regional differences.

Cycles in the growth of infrastructure investment are partly related to demographic changes, notably the birth of the boomer generation and their aging. Infrastructure spending surged during the 1960s and 1970s, when the needs of a rapidly-growing population were easily-met by strong economic growth. A slowdown in population and economic growth and high budget deficits led to a sharp curtailment of infrastructure spending in the 1980s and 1990s. Since 2000, governments have increased their infrastructure capital more than at any time since the golden years of the 1960s and 1970s. This renewed emphasis on infrastructure was reflected in the creation of Infrastructure Canada in 2002.

However, the growth has not been strong enough to prevent signs of wear in our infrastructure (the data are net of depreciation and in constant dollars). This is due to cuts in the 1990s when governments were grappling with significant budgetary deficits, as well as many of the assets

1. Infrastructure capital here is defined as all assets embodied in structures and engineering works. Such capital complements the other factors of production, is long-lived and cannot be easily replaced. Infrastructure does not account for all government capital, which also includes machinery and equipment (such as vehicles and computers).
2. Unless noted otherwise, the rest of the data in this paper refers to the stock of infrastructure capital in constant dollars per capita for different asset types.
3. It is easier to estimate the value of the stock of government infrastructure capital now that all the relevant data have been assembled in one place by Statistics Canada. The data on investment and the stock of capital by asset type are now available by province for the federal, provincial and municipal levels of government from 1961 to 2005. The time series are available in both current and constant dollars. See Statistics Canada's *The Daily* for June 30, 2006.
4. In the Atlantic Provinces, average annual growth of capital was 1.4%, or 0.6 point below the Canada average of 2.0%.

built in the post-war infrastructure boom reaching the end of their life span. Every region experienced a decline in its infrastructure capital during this decade, with the exception of Ontario and British Columbia. One result has been much-publicized problems with our infrastructure.

Over time, capital investment in every region has shifted from the federal to provincial and especially to municipal governments. In some regions, provincial governments took the lead in spending, while in others it was municipal governments. Overall, however, the growth of infrastructure by all levels of government slowed over time everywhere in Canada until the 2000s, when it began to recover.

The per capita level of infrastructure by asset type as well as its growth rate are examined throughout this paper, because the two together present a more complete picture. The per capita measures better reveal the values and priorities of each region, and show the greatest differences in infrastructure by asset type among regions.

2. Overall trends by region

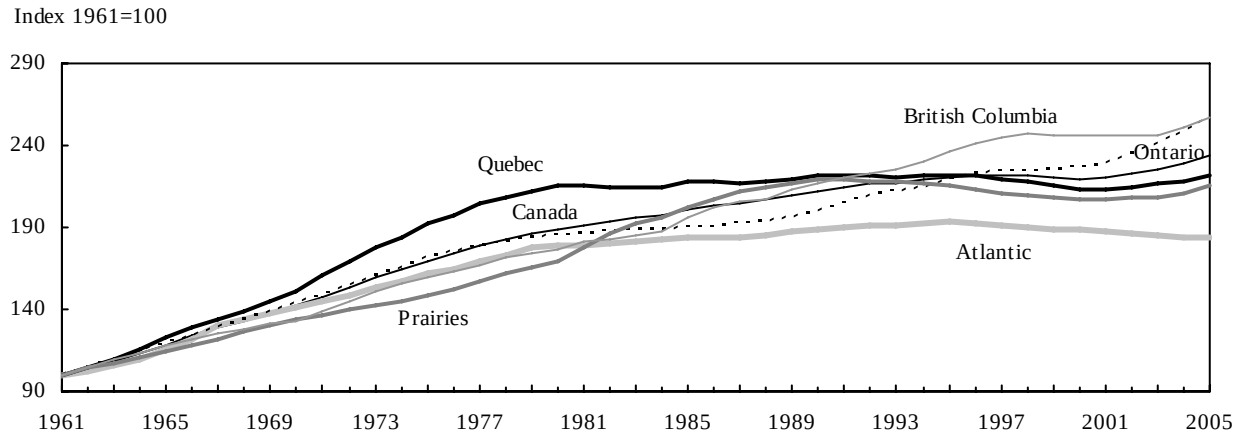
Canada is a diverse federation with each province having different fiscal capabilities. This fiscal capacity is partly 'equalized' by federal-provincial transfers and other spending programs, although each jurisdiction is free to decide where to focus its spending. The distribution of infrastructure assets by region provides one measure of each region's priorities.

Canada's provinces differ in their economic, social, cultural and geographic landscape. These differences are reflected in the growth of the individual components of infrastructure capital in the regions over time. These differences became more pronounced after 1980, when increasing fiscal restraint forced governments to more clearly establish their priorities.

The annual average growth in the volume of infrastructure (in 1997 dollars) was quite similar at about 2% across most regions from 1961 to 2005 (Table 1). It rose slightly more in British Columbia and Ontario (Figure 1a). Growth rates were higher before 1981 than after: indeed, infrastructure capital fell outright in the Atlantic, Quebec and Prairies provinces in the 1990s. Only Ontario and British Columbia did not cut infrastructure in the 1990s, and they led the upturn in the 2000s (when infrastructure capital rose an average 2.8% a year in Ontario and 1.1% in British Columbia). Quebec and the Prairies were not far behind. The Atlantic Provinces were the only ones where infrastructure capital continued to decline in the 2000s, falling 0.5% per year.

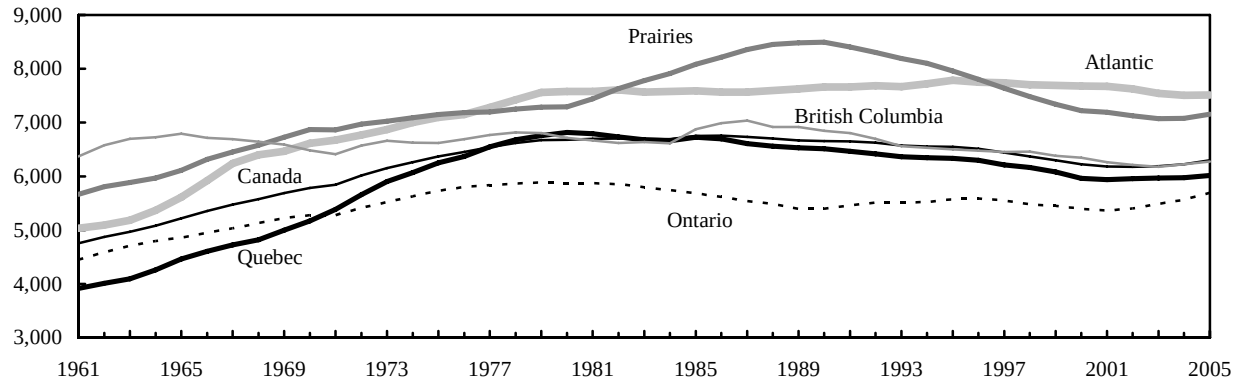
Still, for all regions the infrastructure per capita in 2005 was below its previous peak. On a per capita basis, the less urbanized regions, specifically the Atlantic and Prairie provinces, are better equipped than Quebec and Ontario in terms of the stock of infrastructure capital (Figure 1b). This is partly explained by the fact that overall the centre of gravity of infrastructure capital followed that of population in gradually shifting from the east to the west of the Ottawa River from 1961 to 2005. The Atlantic region rose to first place on a per capita basis only because its population fell significantly, since its infrastructure spending in absolute terms was the weakest of any region.

Figure 1a
Stock of infrastructure capital, by region



Note: In 1997 constant dollars.
Source: Statistics Canada, *Canadian Economic Observer*, September 2007.

Figure 1b
Per capita stock of infrastructure capital, by region



Note: In 1997 constant dollars.
Source: Statistics Canada, *Canadian Economic Observer*, September 2007.

Table 1
Average annual growth of total government infrastructure capital by region and period

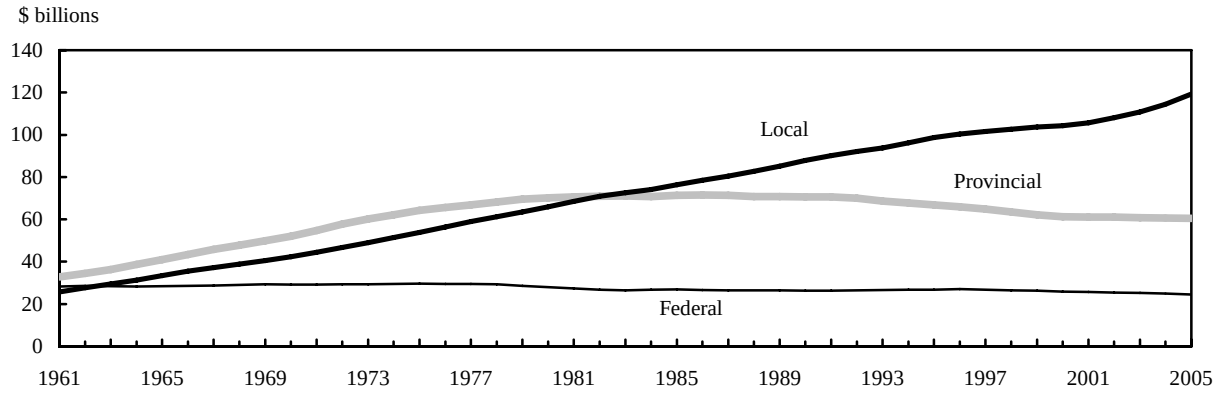
	Atlantic	Quebec	Ontario	Prairies	British Columbia	Canada
			%			
1961 to 1971	3.8	4.8	4.1	3.2	3.3	4.0
1971 to 1981	2.1	3.0	2.2	2.6	2.7	2.6
1981 to 1991	0.6	0.3	1.0	2.1	2.0	1.2
1991 to 2001	-0.1	-0.4	1.1	-0.5	1.1	0.3
2001 to 2005	-0.5	1.0	2.8	0.9	1.1	1.5
1961 to 2005	1.4	1.8	2.2	1.8	2.2	2.0

Note: In 1997 constant dollars.
Source: Statistics Canada, *Canadian Economic Observer*, September 2007.

3. By level of government

All three levels of government spend significantly on infrastructure. Every region showed a relative decline in the ownership of capital by the federal and the provincial governments relative to the municipal level (Figure 2). This shift was more marked in Ontario and Quebec. In Ontario, 67% of government-owned capital in 2005 belonged to municipalities, compared with 38% in 1961. In Quebec, where the provincial government's share fell the most, the decline was twice as steep as for the country overall, from 49% to 33% (see Table A.1 in the Appendix). By comparison, in Prince Edward Island, it was only 17% in 2005 compared with 4% in 1961.

Figure 2
Stock of infrastructure capital, by level of government



Note: In 1997 constant dollars.
Source: Statistics Canada, *Canadian Economic Observer*, September 2007.

Decentralization occurred across many types of assets throughout the period under study. The federal government cut its investments in a wide range of assets (Table A.2 in the Appendix). At the same time, local governments boosted their investments, notably in roads and the environment.

4. By type of asset

This section shows that infrastructure growth differed across regions in terms of the type of assets (Table 2). These differences, as subsequent graphs will show, were sharpened after 1980 when the funds available for infrastructure slowed. Every region showed differences in spending by asset type because their distinct economies, cultures and values required different needs and priorities: British Columbia focused on the environment, as well as recreation and engineering works in view of the upcoming Olympic games; culture and security were a priority in Quebec; sport complexes, water and roads featured in Ontario; marine construction (such as irrigation) was given attention in the Prairies; and institutional buildings (such as training centres) featured in the Atlantic Provinces.

The detailed asset types are regrouped to correspond to the following overall functions, listed in order of their importance to infrastructure capital in 2005: road infrastructure (including bridges and overpasses), which account for almost 40% of all infrastructure capital; environmental protection and the water supply, which together represent nearly one-quarter of all infrastructure; office buildings, which embody approximately 10% of total capital; and the remaining assets, which each account for about 5% or less of all capital, including culture and recreation (notably sports facilities); marine construction and transportation and communications equipment; institutional buildings; security; commercial buildings and engineering works; and research laboratories (Table A.3 in the Appendix).[5] The regional data are mostly presented on a per capita basis (in constant 1997 dollars), which also help adjust for the effect of a slowdown in population growth (from 1.9% in the 1960s to 1.1% in the 1990s, before recovering to 1.3%).

Table 2
Average annual growth of total government infrastructure capital by region and type of asset, 1961 to 2005

	Atlantic	Quebec	Ontario	Prairies	British Columbia	Canada
			%			
Road	1.6	1.4	2.2	1.7	2.3	1.9
Environment	1.8	2.5	2.3	1.3	2.9	2.2
Water systems	1.8	2.4	2.8	2.3	2.2	2.4
Office building	2.2	3.1	2.5	2.5	2.5	2.6
Recreation	3.6	2.6	4.0	3.8	4.7	3.7
Culture	3.7	4.6	3.2	3.4	4.6	3.8
Marine construction	-0.5	0.0	1.9	1.3	0.2	0.9
Other transportation	-0.4	0.2	-1.9	-1.6	-1.6	-1.0
Communication	-1.4	-1.1	-0.9	-2.3	-3.2	-1.4
Laboratories	0.6	2.4	0.3	1.7	-1.1	0.8
Engineering	2.2	3.6	2.2	1.0	4.5	2.7
Institutional	2.4	0.7	2.3	2.4	2.4	2.1
Commercial	1.3	3.0	-0.3	1.2	-0.1	1.0
Security	1.3	3.4	1.2	1.8	1.6	1.7
Other	-2.0	0.7	1.9	1.1	-0.8	0.6
All	1.4	1.8	2.2	1.8	2.2	2.0

Note: In 1997 constants dollars.
Source: Statistics Canada, *Canadian Economic Observer*, September 2007.

4.1 The road system

The development and operation of road infrastructure are essential to the movement of people and goods and drive a large proportion of the economy. These fall mostly under the government's responsibility. Thus, it is not surprising to see that roads and bridges make up the bulk (39.9%) of the government-owned stock of infrastructure. The provincial and municipal governments own the road system in about equal proportions.

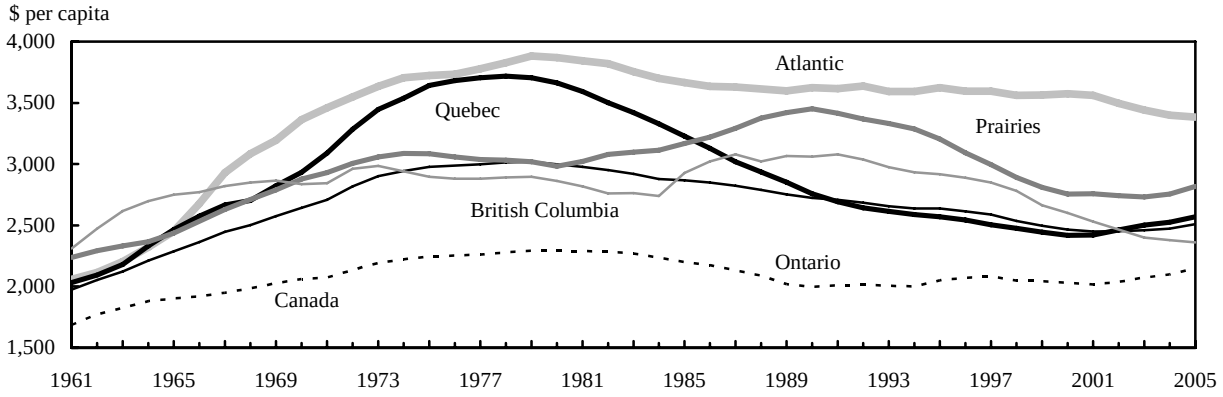
The stock of road infrastructure per capita (in 1997 dollars) increased significantly from 1960 to 1980, but has been eroding since then, falling to $2,511 in 2005 from its peak of $3,019 in 1979. From 1995 to 2000 it fell an average of $322 million a year. Governments have boosted the flow

5. The data only cover the public administration portion of government. Hospitals and schools are excluded, as they are classified as separate industries in the North American Industry Classification System (NAICS), which does not distinguish between public and private ownership. Including hospitals and schools has little impact on the overall trends discussed in this study.

of investment in roads from $4.3 billion in 1998 to $7.3 billion in 2005, but this has not offset the previous decline that set in during the 1980s.

Quebec's road capacity grew rapidly during the golden years of infrastructure spending in the 1960s and 1970s, but has also dominated the decline in subsequent years (Figure 3). In the 1960s and 1970s, with the arrival of Expo and the Olympics, a whole new road network took shape, including the Décarie Expressway[6] and the Louis-Hippolyte Lafontaine Tunnel under the St. Lawrence River (the longest underwater tunnel built in Canada since the 1930s). By the late 1970s, Quebec had invested at least as much in its road system per capita as any region in Canada (see Figure 3).

Figure 3
Stock of infrastructure capital stock, by region – Total road system



Note: In 1997 constant dollars.
Source: Statistics Canada, *Canadian Economic Observer*, September 2007.

In the late 1970s, highway construction started to decline in Quebec. Lower investment spending and steady depreciation resulted in a significant decline in its net capital stock in roads over the next two decades, far more than in any other part of the country. In terms of bridges and overpasses (Figure 4a), Quebec invested so little that the capital stock fell in absolute terms, tumbling from the most in Canada in the late 1970s ($1.6 billion) to reach, at $1.3 billion, approximately the same level as British Columbia and the Atlantic Provinces and below even the Prairies (despite Quebec having the largest land mass among all of the provinces at more than 1.5 million square kilometres,[7] or one quarter of all Canada's territory). Since 2001, its capital stock in roads has started to recover.

The average age[8] of bridges and overpasses in Quebec also has risen constantly since 1976, becoming older than those of any of the other provinces. While Quebec's territory is similar in size to the Prairies, more than half of Quebec's exports travel by road, far more than in the

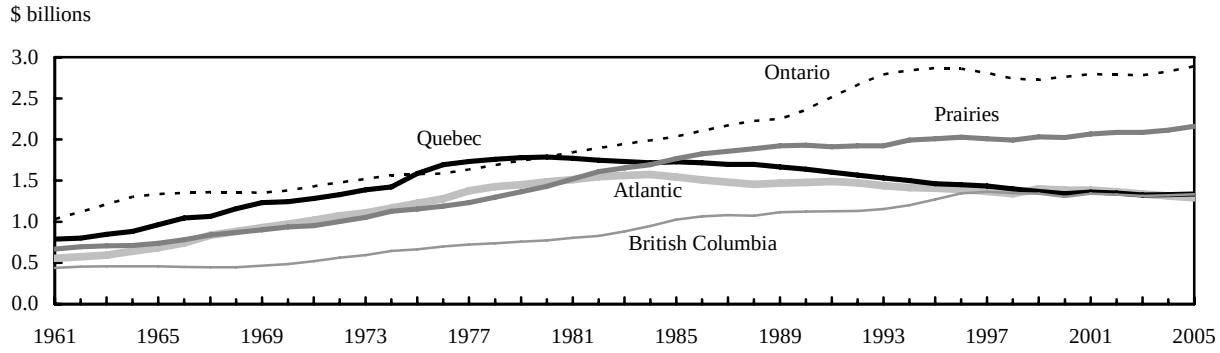
6. Source: http://www.gouv.qc.ca/fr/reseau/routes/autoroute.asp, consulted December 22, 2006.
7. The data on surface territory comes from Natural Resources Canada, Geo Access Division.
8. A note of caution is necessary when analysing the average age of capital stock. The variables used to compute the average age of capital stock are investment, the survival function, the year in which the investment was made, and year-end gross capital stock. In practice, there can be several different types of distributions for a given average age. For example, there can be structures whose ages are clustered around the average age, or a combination of young structures with much older structures.

Prairie Provinces. Trade rose significantly after the North American Free Trade Agreement, and the number of total vehicles registered in Quebec almost doubled after 1975.

Road construction on the Prairies took off in the 1980s. Government-owned road infrastructure per capita in the Prairies continued to rise until the end of the Olympic games in Calgary. It then fell, with Alberta and Saskatchewan reducing their investments in roads the most. Low investment in roads on the Prairies can be associated with industrial demand shifting from roads in favour of trains and pipelines for the transportation of grains and oil and gas. British Columbia did not raise its investment in the road system to keep pace with its population after Expo 86.

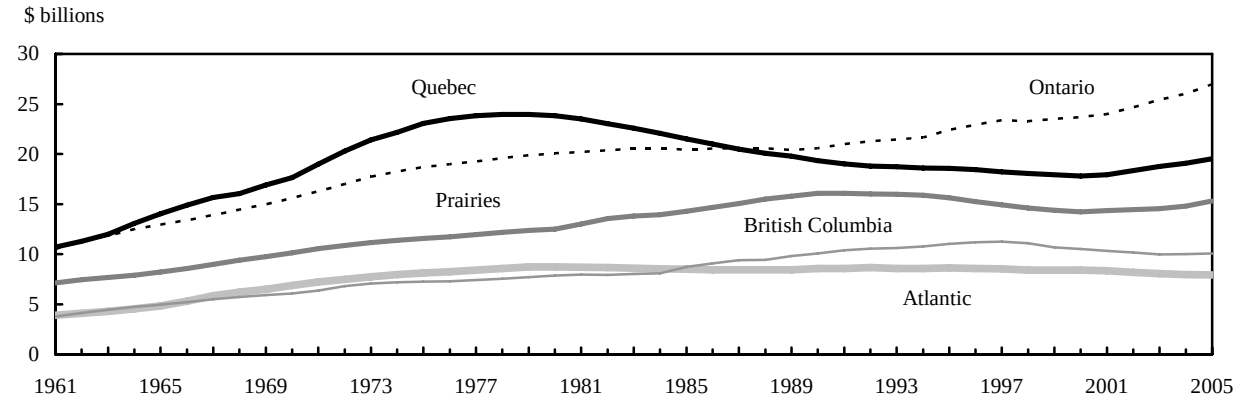
Ontario is the only part of the country where the capital stock in roads continued to rise throughout all four decades. Ontario spent less on government-owned road infrastructure than Quebec until the mid-1980s (figure 4b). After that, it moved ahead of Quebec. The rise in the capital stock in the road network was nearly twice as large in Ontario as in Quebec from 1961 to 2005.

Figure 4a
Stock of infrastructure capital, by region – Bridges, trestles and overpasses



Note: In 1997 constant dollars.
Source: Statistics Canada, *Canadian Economic Observer*, September 2007.

Figure 4b
Stock of infrastructure capital, by region – Roads



Note: In 1997 constant dollars.
Source: Statistics Canada, *Canadian Economic Observer*, September 2007.

The Atlantic Provinces stand out as strong investors in their road system, perhaps because of the importance of tourism. Their per capita road infrastructure is well ahead of the other regions. From 1961 to 2005 the governments of New Brunswick and Prince Edward Island injected at least half of their total infrastructure budgets into the road system. The high level of investments in roads and bridges in Prince Edward Island is largely attributable to the construction of the Confederation Bridge connecting the island to the continent in 1997.

4.2 The environment and water systems

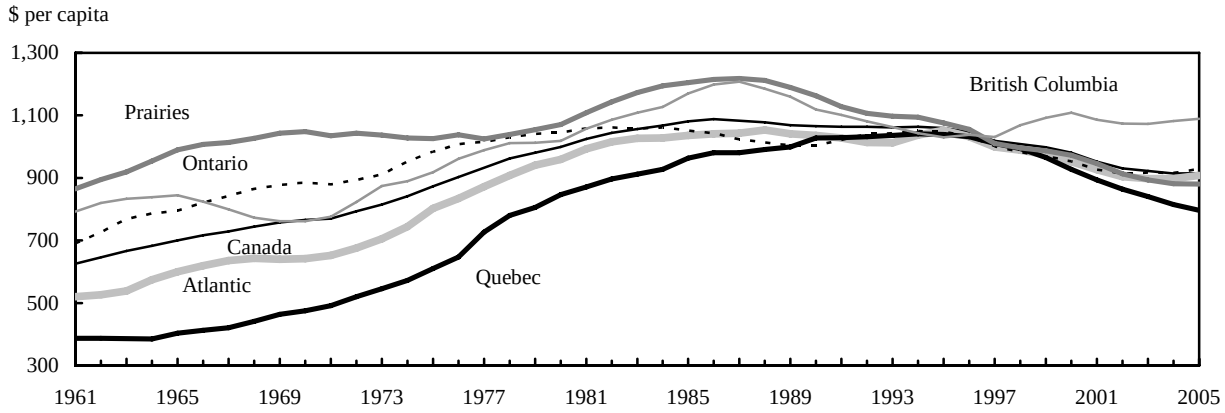
The environment and water systems represent over one-quarter of government-owned capital, with 14.5% for the environment (largely waste water treatment systems and garbage) and 10.8% for water systems (largely for the supply of drinking water). Canada has an abundance of water, ranking second to Finland in terms of the volume and diversity of its water riches per capita, according to a U.N. report. While Canada barely represents 0.5% of the world's population, it has close to 20% of all freshwater reserves.[9]

While provincial and municipal governments share ownership of the roads, environmental management and the management of water systems mainly takes place at the local government level. Municipalities account for more than 80% of capital spending in these areas by supplying a wide range of government-owned infrastructure, mainly pumping and filtration systems and water storage and distribution networks. As with roads, environmental and water system assets rose significantly from 1961 to 1981. Like roads, most regions experienced decreases thereafter.

British Columbia (Figure 5a) has the most government-owned infrastructure per capita related to the environment, while Quebec has the least. The Atlantic Provinces have invested the most in waste management per capita. The presence of this capital may have encouraged the development of its recycling programs.[10] Nova Scotia is the province whose residents recycle the most in Canada, at 157 kilograms per person, ahead of second-place British Columbia.

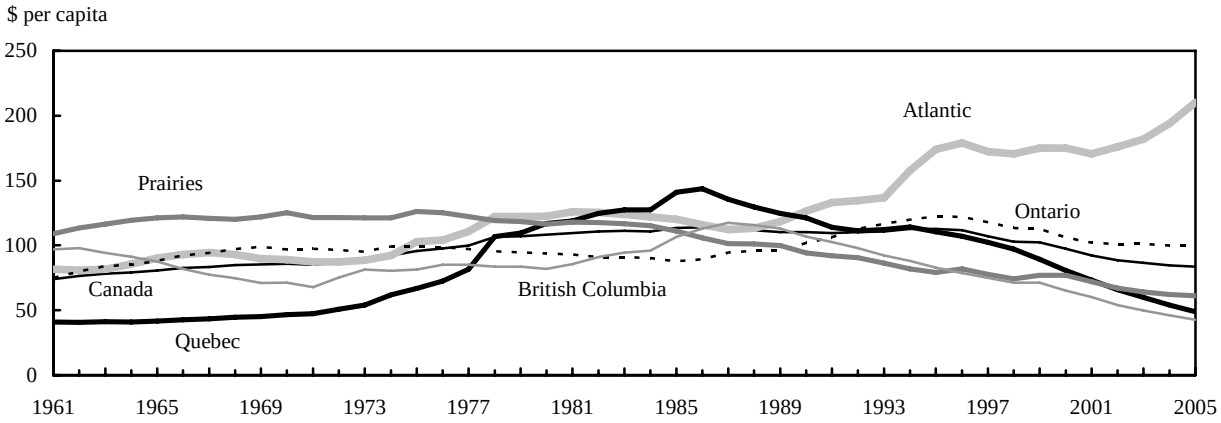
9. Please refer to "Fresh water resources in Canada" in *Human Activity and the Environment Annual Statistics 2003*, Statistics Canada.
10. The data from the Survey of Households and Environment conducted by Statistics Canada in 2006 show that access to recycling programs explains part of the difference in recycling rates across the provinces.

Figure 5a
Stock of infrastructure capital in the environment, by region – Total



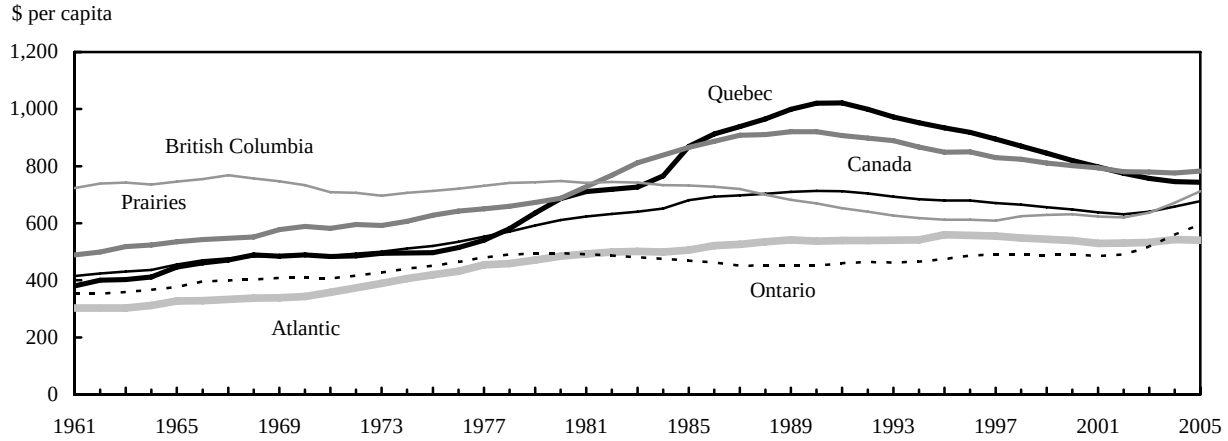
Note: In 1997 constant dollars.
Source: Statistics Canada, *Canadian Economic Observer*, September 2007.

Figure 5b
Stock of infrastructure capital in the environment, by region – Waste management and control



Note: In 1997 constant dollars.
Source: Statistics Canada, *Canadian Economic Observer*, September 2007.

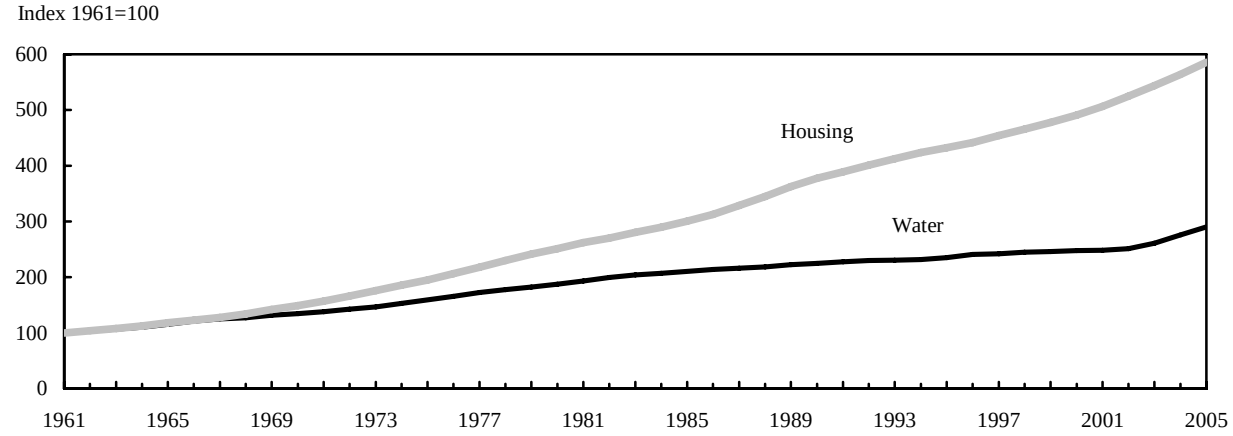
Figure 6
Stock of infrastructure capital, by region – Water systems



Note: In 1997 constant dollars.
Source: Statistics Canada, *Canadian Economic Observer*, September 2007.

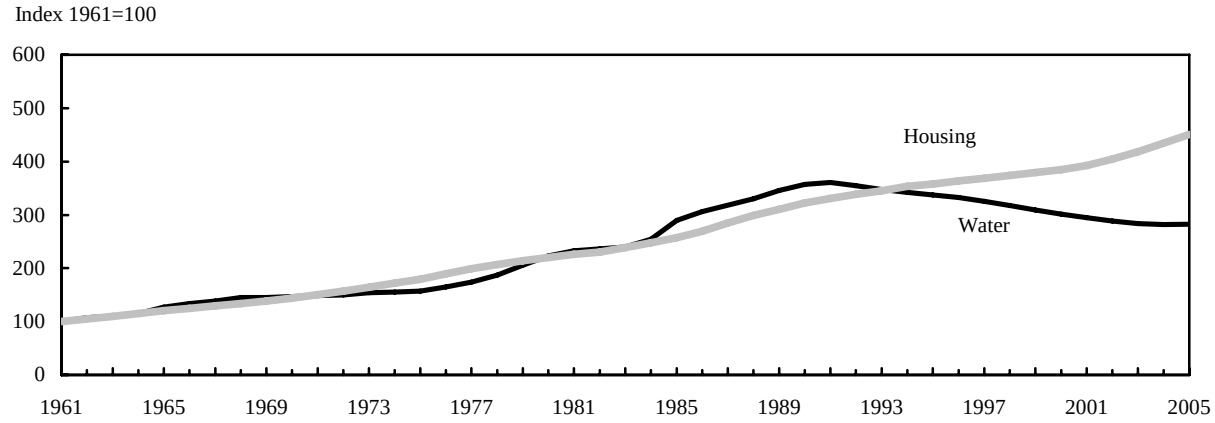
Investment in water systems has barely compensated for the ageing of existing equipment from 1993 to 2002. In fact, as shown in Figure 7a, investment in water systems outside of Quebec kept up with the increase in domestic demand (as indicated by the change in housing stock) only from 1961 to 1965. This was followed by a shortfall, which widened in most parts of Canada until recently. In Quebec, the pattern was different from the other regions (Figure 7b). Quebec made a massive investment in this sector in the 1970s and 1980s, far more than any other part of Canada.

Figure 7a
Stock of infrastructure capital in water systems and the stock of housing – Canada excluding Quebec



Note: In 1997 constant dollars.
Source: Statistics Canada, *Canadian Economic Observer*, September 2007.

Figure 7b
Stock of infrastructure capital in water systems and the stock of housing – Quebec



Note: In 1997 constant dollars.
Source: Statistics Canada, *Canadian Economic Observer*, September 2007.

4.3 Office buildings

In order of magnitude, the road and the environment and water systems are followed by office buildings, which represent 9.2% of the total value of government-owned capital. This type of asset dominates federal infrastructure, with 30.9% of its capital in 2005, ahead of institutional buildings (12.7%) and security (11.2%).

Federal office buildings have become a larger part of total federal capital, up strongly compared with 16.3% in 1961. This is one of the few types of federal asset to have risen steadily in absolute terms from 1961 to 2005, reaching $7.6 billion in 2005 out of a total of $24.5 billion (in constant 1997 dollars). Ontario, with the presence of the capital in Ottawa, accounted for 37.8% of these buildings: still, this placed it behind the Prairies, which passed it in 2003 on a per capita basis. The Atlantic Provinces are well ahead in first place, with per capita investment twice as high as in Ontario.

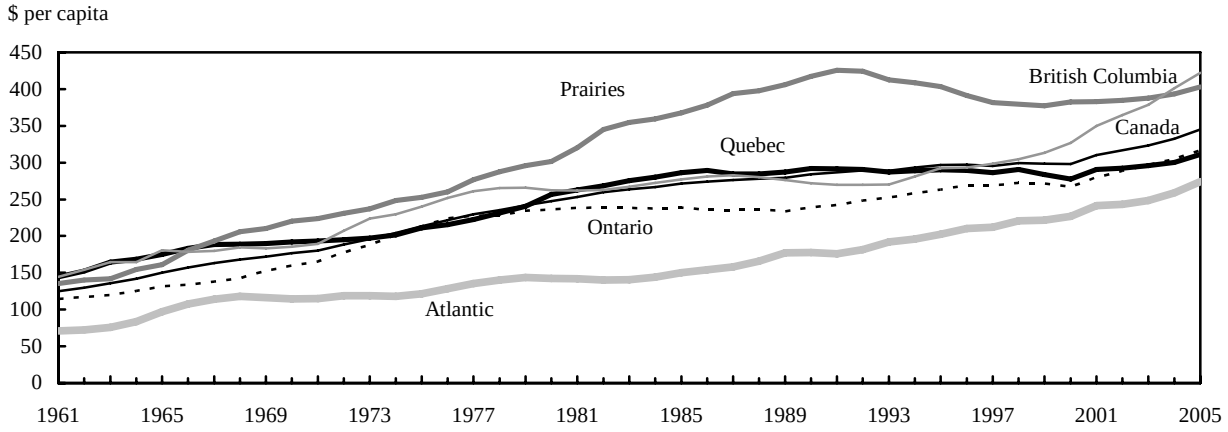
On a per capita basis, the value of office buildings fell by 38.2% in Ontario from 1961 to its low in 1997, tracking a long period of fiscal restraint. Almost half of this loss was later recovered, reflecting a building boom in the Ottawa area. From 1997 to 2005, the value of office buildings rose from $2.1 to $2.9 billion (in constant 1997 dollars).

4.4 Culture and recreation

Recreational facilities provide important gathering places in society. They draw thousands of participants from every level of society to indoor and outdoor sports facilities such as arenas, skating rinks, stadiums, curling arenas, swimming pools and Olympic facilities. These facilities are also used as concert and meeting halls. Cultural facilities include public libraries, historical sites, museums and theatres.

Sports facilities and cultural capital are the asset types that increased the fastest in percentage terms (Table 2), rising 3.7% and 3.8% respectively per year from 1961 to 2005. While there may be a widespread impression that we are spending more time at work and that the leisure society is but an illusion, the population as a whole is working far fewer hours now than it did 40 years ago. Since 1989, the average work week decreased by nearly 2 hours, from 35.7 to 33.9 hours a week. For the total population aged 15 or over, time spent alone increased by 34% from 1986 to 1998 (from 4.4 hours in 1986 to 5.9 hours per day in 1998)[11] and has continued to rise since then.[12] Local governments played the biggest role by far in these infrastructure expenditures. The provincial contributions were much smaller than the municipal ones, and they decreased over time.

Figure 8
Stock of infrastructure capital, by region – Sports facilities



Note: In 1997 constant dollars.
Source: Statistics Canada, *Canadian Economic Observer*, September 2007.

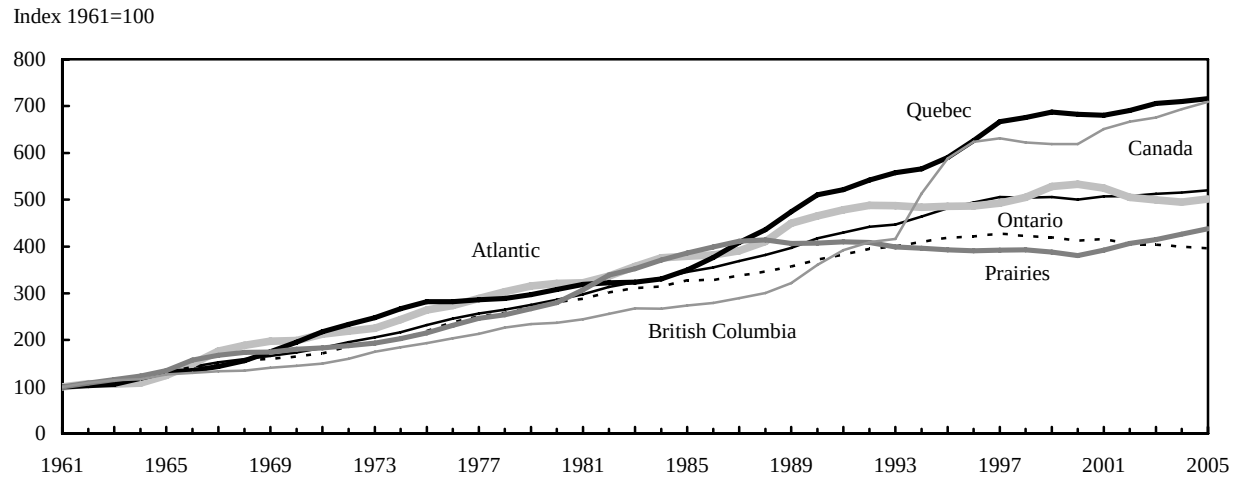
Overall, however, sports facilities represented a relatively small portion (5.5%) of total infrastructure capital. Per capita, their stock in constant 1997 dollars amounted to slightly more than $300 in 2005. The capital stock in sports facilities decreases moving from west to east, from $422 per capita in British Columbia to $403 in the Prairies, $317 in Ontario, $311 in Quebec and $274 in the Atlantic Provinces. The dollar amounts were higher out west, as international events such as the 1988 Olympic Games in Calgary were relatively recent and, as a result, the facilities depreciated less than in the east, where they were older. Moreover, the Vancouver games already have started to accelerate their level in British Columbia. The 1976 Olympic Games in Montréal had increased Quebec's capital stock. The Atlantic Provinces are well behind the other regions in this regard, having never hosted a major international sports event. Also, the Atlantic Provinces are the only ones in the country without a major sports team.

It is in Quebec that culture infrastructure capital is most prominent. Figures 9a and 9b illustrate the gap between Quebec and much of the rest of Canada that has developed since the mid-1980s. From 1961 to 2005, culture was (with office buildings) the only area of government investment for which Quebec was well ahead of the growth in government-owned capital infrastructure in

11. W. Clark. 2002. "Time Alone," *Canadian Social Trends*. Ottawa, Statistics Canada.
12. Time alone includes time spent listening to music, reading and watching television or time spent on sports or other cultural events.

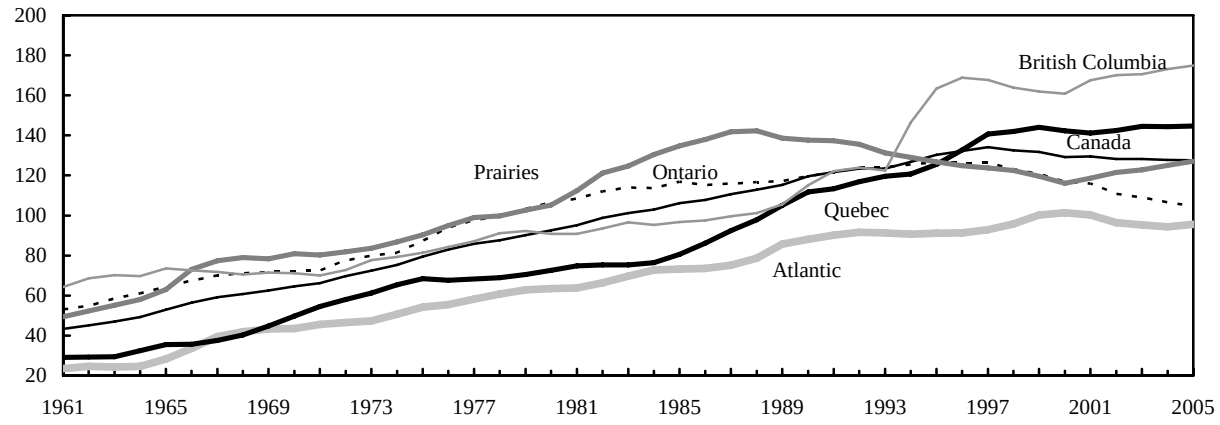
the rest of the country. In 2005, British Columbia was closing in, followed by the Atlantic Provinces, the Prairies and Ontario.

Figure 9a
Stock of infrastructure capital, by region – Culture



Note: In 1997 constant dollars.
Source: Statistics Canada, *Canadian Economic Observer*, September 2007.

Figure 9b
Stock of infrastructure capital, by region – Culture



Note: In 1997 constant dollars.
Source: Statistics Canada, *Canadian Economic Observer*, September 2007.

Quebec increased its investments in cultural facilities much more than in sports facilities, the opposite of most regions elsewhere (British Columbia increased its investments equally in both). Nonetheless, culture is only a small share of government-owned capital in Quebec as elsewhere. Culture capital is approximately $100 per capita for public libraries, museums, theatres and historical sites. After 2000, the growth of culture capital fell behind roads in Quebec.

The Atlantic Provinces posted growth about equal to the national average for both recreation and culture. Nonetheless, per capita, they lagged well behind the national average over the four decades, since they started from the lowest level.

4.5 Marine construction and other transportation and communications equipment

Assets related to marine construction and other transportation and communications equipment accounted for most of the federal government's investment slowdown from 1961 to 2005, and weighed heavily on the growth of all government-owned capital during the period under study (Table 3). The federal government has cut back by 1.5% a year on average its capital in this type of asset since 1961.

Table 3
Average annual growth of federal government infrastructure capital by region and type of asset, 1961 to 2005

	Atlantic	Quebec	Ontario	Prairies	British Columbia	Canada
			%			
Road	-2.1	-1.8	-0.9	-1.8	-1.5	-1.5
Environment	-2.3	-0.4	-0.8	-1.1	-1.3	-1.1
Water systems	-2.4	-1.4	-0.1	-0.5	-0.8	-0.8
Office building	1.2	1.4	1.0	1.1	1.1	1.1
Culture	-1.0	3.1	0.4	-0.3	-1.1	0.5
Marine construction	-1.4	-0.7	-1.4	-2.4	-1.7	-1.5
Other transportation	-0.3	-0.4	-1.7	-1.1	-1.7	-1.0
Communication	-1.4	-1.4	-1.0	-2.3	-3.4	-1.5
Laboratories	0.3	1.7	-0.2	1.4	-2.3	0.2
Engineering	-2.7	0.4	0.5	1.3	0.6	0.5
Institutional	0.5	-0.4	-0.8	1.9	0.1	0.3
Commercial	0.2	-1.4	-1.6	-0.5	-1.6	-1.1
Security	0.3	1.1	-0.7	1.3	0.3	0.2
Other	-3.4	-2.1	-1.1	-2.0	-2.5	-2.1
All	-0.7	-0.1	-0.3	-0.2	-0.7	-0.3

Note: In 1997 constants dollars.
Source: Statistics Canada, *Canadian Economic Observer*, September 2007.

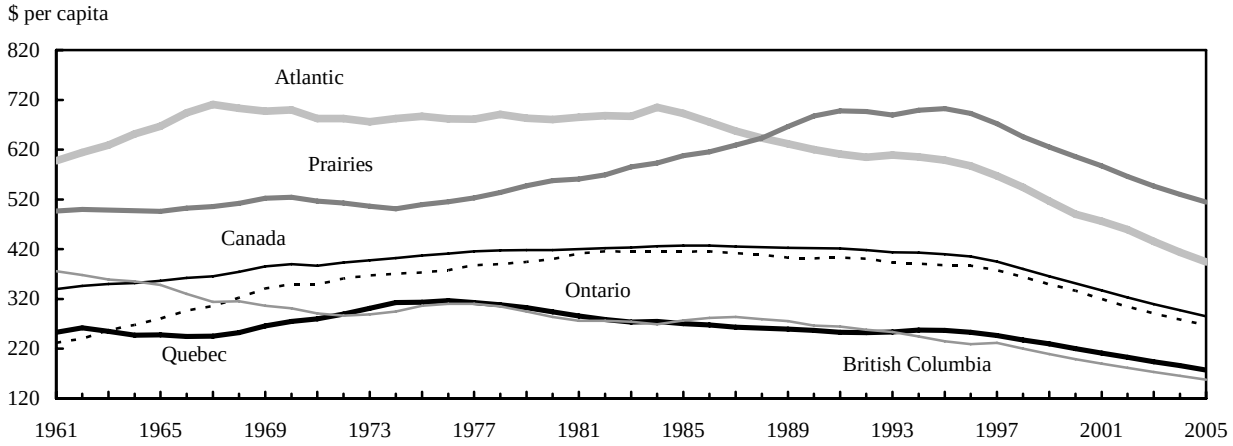
Marine construction largely includes irrigation, wharves, docks, terminals, breakwaters, canals and works along shorelines. The decline, particularly for wharves, docks and terminals, occurred across the country, but mostly in the Prairies (-2.4%). The other levels of government more than compensated for the drop only in the Prairies and Ontario, especially for work on canals and shorelines. In the Prairies, municipalities invested heavily in this sector, where it represented more than 5% of capital held by all levels of government. This boosted infrastructure capital to close to $2 billion in 2005 in irrigation work and shorelines (including the Greater Winnipeg Floodway built in the 1960s), as well as canals.

The decrease in expenditures on federal infrastructure offset increases in this area by the provincial and municipal governments in Quebec and British Columbia.

In the Atlantic Provinces, all levels of government combined spent an average 0.5% less annually. However, these data do not capture investments by Crown corporations. The decrease

in the Atlantic Provinces occurs just as the Marine Atlantic Inc. crown corporation was set up, with a mandate to run a marine transportation service under contract with Transport Canada. Nonetheless, the capital stock for the transportation industry illustrates that, for the country as a whole, this infrastructure showed a slight downward trend per capita (these data are confidential on a provincial basis).

Figure 10
Stock of infrastructure capital, by region – Marine



Note: In 1997 constant dollars.
Source: Statistics Canada, *Canadian Economic Observer*, September 2007.

Other transportation equipment includes aircraft storage, railway tracks and passenger terminals. The infrastructure in these assets fell an average of 1% annually for the federal government. However, the other levels of government did not make up for these losses, and total government assets fell by less than 1% annually (part of the decline reflects the privatization of assets). This asset type accounts for less than 1% of total government-owned assets.

The federal government also reduced its investments in communications, but the private sector stepped up its investments in this area, at least until the Internet bubble burst in 2000.

4.6 Research laboratories and engineering

The federal government, which is the major stakeholder in this type of asset, just barely maintained its investments in research laboratories. However, there are strong regional variations. While such capital rose an average of 1.7% annually in Quebec and 1.4% annually in the Prairies, it fell by 2.3% in British Columbia.

Most of the engineering work was done by local administrations, which boosted the overall capital stock, especially in British Columbia, where this capital grew by 5.3% a year.

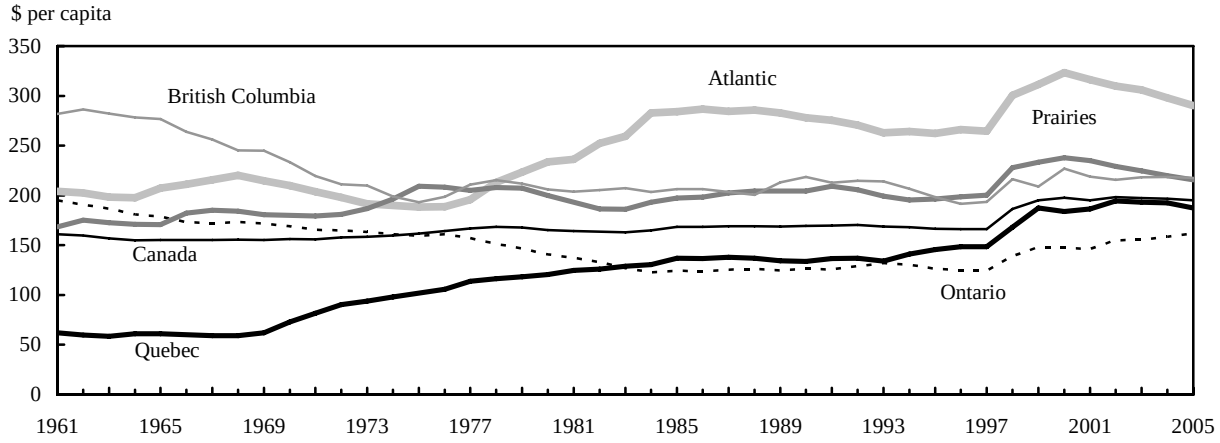
4.7 Institutional and commercial construction

While the three levels of government share ownership of this type of capital more or less equally, here again the federal government has slowed its capital outlays since 1961. Federal capital growth in institutional buildings (which include veterans' hospitals, training and day care centres) rose only 0.3% annually, compared with 2.1% for all levels of government. Commercial capital (warehouses and garages) decreased by 1.1% annually, with Quebec, Ontario and British Columbia reporting the strongest declines. At the same time, the Atlantic Provinces reported higher growth for institutional and commercial construction than the Canadian average.

4.8 Security

Security-related assets include penitentiaries, detention homes and courthouses. They represent only 3.1% of the value of total government-owned capital. However, for all provincial and federal governments combined, security-related capital has been the main contributor to overall growth since 1961, after roads and office towers. Regionally, there was a shift in capital toward Quebec and the Atlantic Provinces, where the provincial governments invested a great deal. Ontario's investment was the lowest per capita.

Figure 11
Stock of infrastructure capital, by region – Security



Note: In 1997 constant dollars.
Source: Statistics Canada, *Canadian Economic Observer*, September 2007.

5. Summary

While Ontario reported a rate of increase in total infrastructure spending similar to the national average for the entire 1961-to-2005 period, it moved ahead considerably beginning in 2000. Its infrastructure expenditures rose in most areas, led by roads, water supply, recreational and office towers.

Quebec quickly moved from last place in terms of infrastructure capital per capita in 1961 to equal the Canadian average with the 1976 Olympic games, moving well ahead of Ontario during that decade due to roads and culture. While growth remained positive for culture, two decades of

eroding investment in roads lowered infrastructure capital. Capital recovered in the 2000s, led by commercial construction and research laboratories, while spending on roads moved ahead of culture.

Given its slow population growth, the Atlantic Provinces were almost nose to nose with the Prairies for the lead in government-owned infrastructure per capita. Government-owned infrastructure in absolute terms continued to decrease in the 2000s in the Atlantic region, unlike the other parts of the country. These declines were mainly in marine construction, transportation equipment and communications, which offset gains in roads and institutional buildings.

The Prairies took the lead in per capita investment in infrastructure during the 1980s due, among other things, to the 1988 Olympic games in Calgary. They slowed in the 1990s, with the decrease in oil revenues, falling behind the Atlantic Provinces. Investment recently recovered as the price of oil rebounded.

Infrastructure capital per capita in British Columbia was close to the national average for a large portion of the period under study, from 1971 to 2005. Recent growth has been strong in sports facilities and engineering works, boosted by the upcoming Olympic games.

Appendix

Table A.1
Share in total government infrastructure capital, 2005 and 1961, by region and level of government

	Year	Atlantic	Quebec	Ontario	Prairies	British Columbia
			%			
Local	2005	33	58	67	56	59
	1961	8	30	38	32	22
Province	2005	47	33	22	30	29
	1961	42	49	31	35	35
Federal	2005	20	9	10	14	12
	1961	49	21	31	33	43
Total	2005	100	100	100	100	100
	1961	100	100	100	100	100

Notes: In 1997 constant dollars. Figures may not add to 100% due to rounding.
Source: Statistics Canada, *Canadian Economic Observer*, September 2007.

Table A.2
Average annual growth of government infrastructure capital by level of government and type of asset, 1961 to 2005

	Federal	Provincial	Local	All
		%		
Road	-1.5	1.3	3.3	1.9
Environment	-1.1	0.2	3.4	2.2
Water systems	-0.8	0.6	3.2	2.4
Office building	1.1	3.9	5.5	2.6
Recreation	…	0.9	4.5	3.7
Culture	0.5	3.6	4.5	3.8
Marine construction	-1.5	1.2	2.3	0.9
Other transportation	-1.0	-1.2	4.3	-1.0
Communication	-1.5	1.5	…	-1.4
Laboratories	0.2	3.2	4.7	0.8
Engineering	0.5	2.3	2.8	2.7
Institutional	0.3	3.5	5.3	2.1
Commercial	-1.1	3.4	4.8	1.0
Security	0.2	4.5	5.5	1.7
All	-0.3	1.4	3.5	2.0

… not applicable
Note: In 1997 constant dollars.
Source: Statistics Canada, *Canadian Economic Observer*, September 2007.

Table A.3
Asset share in total government infrastructure capital, Canada, 2005

End of year net capital stock by asset	Federal	Provincial	Local	All
		%		
Road	0.8	20.4	18.6	39.9
Environment	0.8	1.7	12.0	14.5
Water systems	0.6	0.7	9.5	10.8
Office building	3.7	1.8	3.7	9.2
Recreation	0.0	0.7	4.8	5.5
Culture	0.1	0.3	1.6	2.0
Marine construction	0.7	0.8	3.0	4.5
Other transportation	0.4	0.1	0.0	0.6
Communication	0.4	0.0	0.0	0.4
Laboratories	0.6	0.2	0.0	0.8
Engineering	0.0	0.0	1.0	1.1
Institutional	1.5	0.9	1.9	4.3
Commercial	0.5	0.5	0.5	1.5
Security	1.4	1.3	0.4	3.1
Other	0.4	0.4	0.9	1.7
All	12.1	29.8	58.2	100.0

Note: In 1997 constant dollars.
Source: Statistics Canada, *Canadian Economic Observer*, September 2007.

Table A.4
Average annual growth of local government infrastructure capital by region and period

	Atlantic	Quebec	Ontario	Prairies	British Columbia	Canada
			%			
1961 to 1971	7.3	5.5	4.1	3.6	6.4	5.6
1971 to 1981	7.6	5.5	2.2	3.1	5.7	4.4
1981 to 1991	2.8	3.0	1.0	2.3	2.6	2.7
1991 to 2001	1.6	0.6	1.1	-0.2	3.8	1.6
2001 to 2005	2.3	0.6	2.8	1.4	3.2	3.0
1961 to 2005	4.6	3.3	2.2	2.1	4.5	3.5

Note: In 1997 constant dollars.
Source: Statistics Canada, *Canadian Economic Observer*, September 2007.

Table A.5
Growth in government infrastructure capital by region, by asset type and period

	1961 to 1971	1971 to 1981	1981 to 1991	1991 to 2001	2001 to 2005	1961 to 2005
			%			
Atlantic						
Road	6.3	1.9	-0.1	-0.3	-1.2	1.6
Environment	3.2	5.1	0.8	-1.2	-0.5	1.8
Water systems	2.6	4.1	1.4	-0.3	0.5	1.8
Office building	-1.2	-0.2	4.1	6.3	2.3	2.2
Recreation	5.9	2.9	2.7	3.1	3.3	3.6
Culture	7.8	4.2	4.0	0.9	-1.1	3.7
Marine construction	2.3	0.8	-0.7	-2.6	-4.6	-0.5
Other transportation	0.4	-1.3	2.6	-1.1	-6.0	-0.4
Communication	0.8	-1.9	1.9	-3.4	-8.5	-1.4
Laboratories	0.6	3.5	-1.0	-2.2	4.9	0.6
Engineering	4.1	6.1	-0.1	-1.4	2.3	2.2
Institutional	1.4	3.8	3.0	-0.1	6.7	2.4
Commercial	1.0	1.4	3.9	1.0	-3.9	1.3
Security	0.9	2.3	2.0	1.3	-2.1	1.3
Other	-0.5	-1.8	-1.5	-5.7	1.4	-2.0
All	3.8	2.1	0.6	-0.1	-0.5	1.4
Quebec						
Road	5.9	2.2	-2.1	-0.6	2.2	1.4
Environment	4.0	6.6	2.5	-0.9	-2.2	2.5
Water systems	4.0	4.6	4.5	-2.0	-1.1	2.4
Office building	3.4	3.6	1.4	3.9	3.5	3.1
Recreation	4.5	3.8	1.8	0.4	2.4	2.6
Culture	8.1	3.9	5.0	2.7	1.3	4.6
Marine construction	2.6	0.9	-0.4	-1.3	-3.6	0.0
Other transportation	2.4	2.4	0.6	-0.7	-8.9	0.2
Communication	2.6	1.1	0.2	-4.9	-9.1	-1.1
Laboratories	1.7	-0.7	4.7	1.5	8.6	2.4
Engineering	2.8	4.9	6.1	2.4	-1.2	3.6
Institutional	2.1	1.8	0.9	-1.9	0.7	0.7
Commercial	2.2	4.1	1.8	-1.0	16.0	3.0
Security	4.4	5.0	1.7	3.6	0.8	3.4
Other	3.7	1.6	0.0	-2.0	-0.8	0.7
All	4.8	3.0	0.3	-0.4	1.0	1.8
Ontario						
Road	4.5	2.2	0.4	1.3	3.0	2.2
Environment	4.8	3.1	1.3	0.3	1.4	2.3
Water systems	3.8	3.1	1.0	1.9	6.6	2.8
Office building	4.0	1.2	1.8	2.8	3.2	2.5
Recreation	6.2	4.9	1.9	2.8	4.5	4.0
Culture	5.5	5.3	2.9	0.8	-1.2	3.2
Marine construction	6.6	2.8	1.5	-1.0	-3.1	1.9
Other transportation	0.6	0.1	-2.6	-3.5	-6.9	-1.9
Communication	-1.4	-2.2	1.7	0.6	-6.6	-0.9
Laboratories	1.2	0.7	0.9	0.0	-3.4	0.3
Engineering	3.6	4.1	2.8	-0.8	0.4	2.2
Institutional	3.7	1.1	1.4	0.3	9.3	2.3
Commercial	2.4	0.9	-0.3	-1.9	-5.5	-0.3
Security	0.6	-0.7	0.8	2.9	4.0	1.2
Other	0.7	-0.7	-0.7	4.1	13.5	1.9
All	4.1	2.2	1.0	1.1	2.8	2.2

Table A.5
Growth in government infrastructure capital by region, by asset type and period
(concluded)

	1961 to 1971	1971 to 1981	1981 to 1991	1991 to 2001	2001 to 2005	1961 to 2005
			%			
Prairies						
Road	4.0	2.1	2.1	-1.1	1.6	1.7
Environment	3.0	2.5	1.1	-0.7	-0.8	1.3
Water systems	3.0	4.1	3.1	-0.3	0.7	2.3
Office building	1.4	5.1	2.9	0.4	3.2	2.5
Recreation	6.4	5.5	3.8	0.0	2.3	3.8
Culture	6.2	5.3	2.9	-0.4	2.8	3.4
Marine construction	1.6	2.7	3.1	-0.7	-2.2	1.3
Other transportation	2.3	1.3	-2.4	-6.1	-4.6	-1.6
Communication	1.0	-0.7	-1.0	-6.1	-7.1	-2.3
Laboratories	2.2	2.7	1.9	1.8	-2.6	1.7
Engineering	6.6	3.4	-1.2	-3.6	-1.5	1.0
Institutional	1.8	3.4	2.9	1.9	0.9	2.4
Commercial	-0.1	2.7	2.8	0.0	-0.3	1.2
Security	1.9	2.6	1.7	2.2	-1.1	1.8
Other	3.1	-2.2	-0.9	2.0	7.0	1.1
All	3.2	2.6	2.1	-0.5	0.9	1.8
British Columbia						
Road	5.4	2.3	2.7	-0.1	-0.7	2.3
Environment	3.0	5.6	2.2	1.8	1.1	2.9
Water systems	3.0	2.8	0.5	1.4	4.5	2.2
Office building	1.9	2.9	0.6	3.4	5.5	2.5
Recreation	6.1	5.7	2.1	4.6	5.9	4.7
Culture	4.1	5.1	4.8	5.2	2.2	4.6
Marine construction	0.6	1.8	1.4	-1.4	-3.6	0.2
Other transportation	0.8	-0.7	1.7	-5.1	-8.3	-1.6
Communication	-1.8	-1.1	-1.7	-5.9	-9.2	-3.2
Laboratories	-0.7	0.0	-1.4	-0.4	-5.3	-1.1
Engineering	6.8	6.5	3.3	0.6	6.3	4.5
Institutional	1.1	3.5	1.4	4.6	0.2	2.4
Commercial	1.8	-0.8	1.5	-1.0	-4.9	-0.1
Security	0.7	1.6	2.2	2.2	0.9	1.6
Other	-1.5	-1.8	-0.4	-1.6	5.6	-0.8
All	3.3	2.7	2.0	1.1	1.1	2.2
Canada						
Road	5.1	2.2	0.3	0.0	1.6	1.9
Environment	4.0	4.2	1.6	-0.1	0.0	2.2
Water systems	3.5	3.8	2.6	-0.1	2.5	2.4
Office building	2.7	2.5	2.1	2.9	3.4	2.6
Recreation	5.7	4.7	2.5	1.8	3.7	3.7
Culture	6.2	5.0	3.7	1.7	0.6	3.8
Marine construction	3.2	2.1	1.3	-1.2	-3.1	0.9
Other transportation	1.4	0.7	-0.4	-3.1	-7.0	-1.0
Communication	0.0	-0.9	0.9	-3.0	-7.9	-1.4
Laboratories	1.2	1.2	1.0	0.3	-0.6	0.8
Engineering	4.5	4.4	2.8	-0.1	0.4	2.7
Institutional	2.5	2.4	1.9	1.0	4.1	2.1
Commercial	1.7	1.6	1.4	-0.9	1.5	1.0
Security	1.5	1.7	1.6	2.4	1.0	1.7
Other	1.6	-0.7	-0.6	0.0	6.3	0.6
All	4.0	2.6	1.2	0.3	1.5	2.0

Note: In 1997 constant dollars.
Source: Statistics Canada, *Canadian Economic Observer*, September 2007.

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