ECONOMIC VIEWPOINT

Quebec Is Faring Well With Regards to Capital Growth, but Demographic Growth Will Bring New Challenges

By Hendrix Vachon, Principal Economist, and Lorenzo Tessier-Moreau, Principal Economist

Building capital is key to supporting long-term economic growth. Capital covers all assets that enable production of various goods and services. It also impacts labour productivity. Building residential capital is also especially important, since it helps meet people's housing needs. The most recent provincial data now includes 2022, and Quebec is performing well compared to the Canadian average. It's also important to compare trends in capital and demographics. Historically, capital stock has increased faster than the population, which we continue to see in Quebec. That said, based on various projections, we do expect to have considerable investment needs in the coming years. For Canada as a whole, the challenge is even greater.

Why Is Capital Important?

Classical economic theory teaches us that an economy's total output is determined by its two main inputs: capital and labour (see appendix). New advances in technology affecting capital and workers' expertise will also impact goods and services production capacity, as will the balance between factors of production. Generally, the more an input is used in a production process, the less productive it becomes. For example, increasing the number of employees on a construction site without providing any additional tools means that any new employees are likely to be less and less efficient. On the other hand, giving every employee 10 hammers is unlikely to help significantly increase total output—although workers might spend less time looking for a hammer!

We can also draw parallels with inflation and interest rates because economic concepts are so often intertwined. A chronic lack of capital could cause a structural imbalance between supply and demand that would maintain inflationary pressure. To curb this pressure, interest rates should be kept higher for longer. Capital stock can also be linked to wages and to income and wealth inequality. A drop in the ratio of available capital per worker could lead to lower productivity and compensation, but, as capital is scarcer, have the opposite impact on return on capital (increased value of capital, higher returns on assets). Owners of capital would therefore see their situation improve while workers would be worse off. This could create income and wealth redistribution issues.

Capital—which comes in many forms—must be measured accurately. It's defined as total investments over time, minus depreciation. While investments are relatively easy to recognize, depreciation of existing capital is more difficult to quantify. The Statistics Canada data used in this analysis is based on a geometric depreciation function, where the annual depreciation corresponds to a fixed percentage of the capital's residual value.

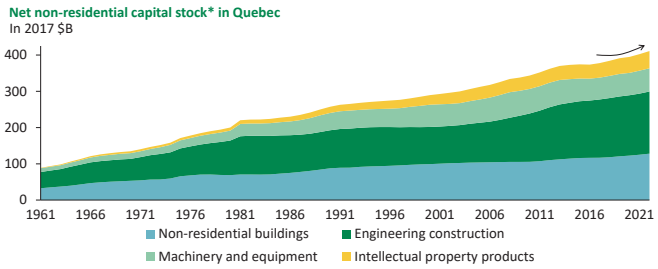
Non-residential Capital Growth Has Accelerated in Quebec

Available data on capital stock generally distinguishes between residential and non-residential or productive capital. Non-residential capital has the biggest impact on the production of the goods and services we consume. In Quebec, non-residential capital stock has continually increased over the years and accelerated between 2018 and 2022, which is good news (graph 1 on page 2). Engineering work, which includes infrastructure, accounts for the lion's share of capital stock, but in recent years the intellectual property product portion has been growing more quickly (graph 2 on page 2). However, we haven't returned to the high pace of growth that prevailed from the 1990s to 2005. Machinery and equipment—which declined for several years before starting to grow again—has seen a notable improvement.

Desjardins Economic Studies: 514-281-2336 or 1-866-866-7000, ext. 5552336 • desjardins.economics@desjardins.com • desjardins.com/economics

GRAPH 1

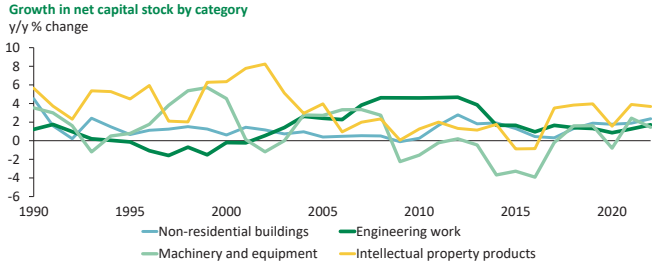
Non-residential Capital Stock Has Been Growing More Quickly in Quebec for Several Years



*Stock depreciated based on a geometric function
Statistics Canada and Desjardins Economic Studies

GRAPH 2

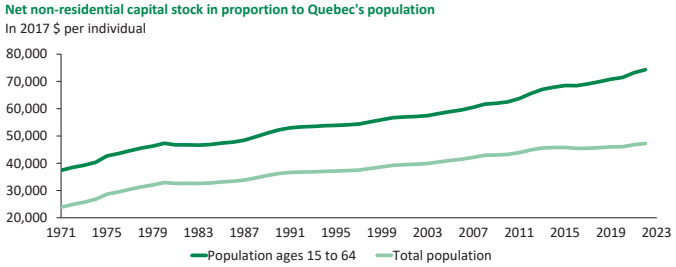
Intellectual Property Products Are Growing More Quickly in Quebec, but Not as Fast as They Were between 1990 and 2005



Statistics Canada and Desjardins Economic Studies

GRAPH 3

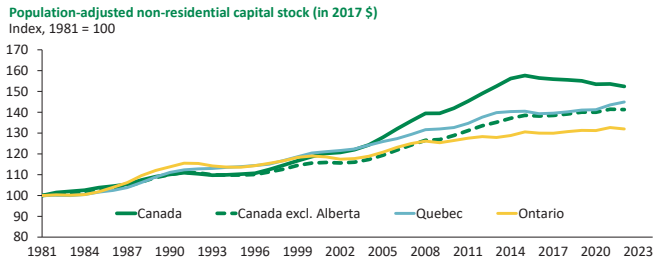
Capital Stock Is Increasing More Quickly than the Total Population and the Labour Pool



Statistics Canada and Desjardins Economic Studies

GRAPH 4

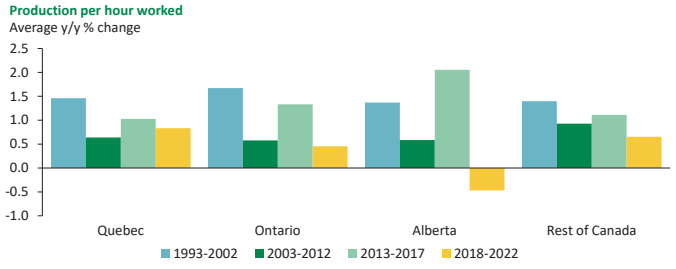
Population-Adjusted Capital Stock Is Declining in Canada, but the Picture Improves If We Exclude Alberta



Statistics Canada and Desjardins Economic Studies

GRAPH 5

Quebec's Average Productivity Gains Were Better from 2018 to 2022



Statistics Canada and Desjardins Economic Studies

These numbers are fairly encouraging, but we need to consider demographic trends in our analysis to see if the outlook for worker productivity and the ability to meet increased demand for goods and services remains positive. Dividing the capital stock by the working age population (ages 15–64) provides a figure of available capital relative to the size of the main labour pool, a ratio that's increasing sharply (graph 3). The capital stock to total population ratio is also rising, albeit less strongly. It was fairly stable from 2014 to 2019 but has rebounded since. Quebec's aging population means that the labour pool is growing more slowly, while the population aged 65 and older—who continue to consume a wide range of goods and services—is increasing more quickly. Capital seems to be growing enough to support worker productivity, but not enough to meet the needs of the entire population.

The overall Canadian picture is no better as the non-residential capital to total population ratio has been declining since 2015, primarily due to lower investment in the oil industry. Excluding Alberta, where a large part of the oil industry is concentrated (graph 4), the trend becomes slightly positive. However, the ratio decreased in 2022, in contrast with the continued rebound in Quebec. The more favourable capital stock trend in Quebec in recent years may have helped the province maintain annual productivity gains of close to 1%, while productivity has fallen more sharply elsewhere in Canada (graph 5).

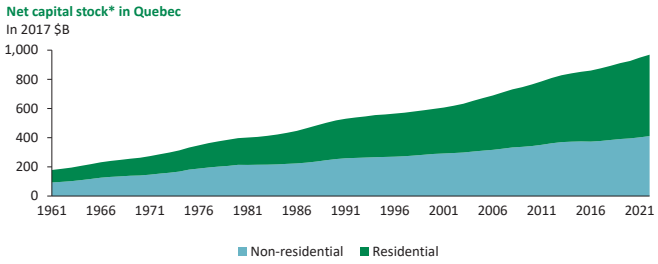
Residential Capital Keeps Increasing

Now let's look at residential capital stock, which plays an important economic role because it helps meet people's essential housing needs. In Quebec, residential capital is growing faster than non-residential capital (graph 6 on page 3) and now accounts for 58% of total capital stock. That's still lower than Ontario, but higher than the Canadian average (graph 7 on page 3).

The surge in residential capital stock seems to contradict other data that shows major housing accessibility issues in Quebec and across Canada. The residential capital ratio per individual

GRAPH 6

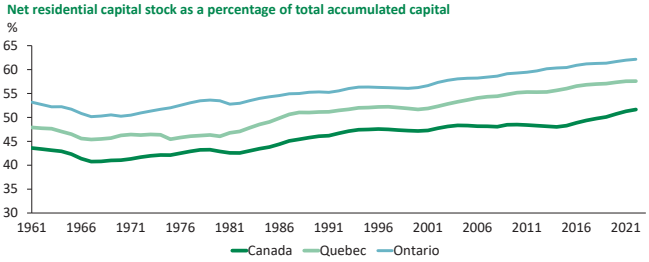
Residential Capital Stock Has Been Growing More Quickly than Non-residential Capital Stock



*Stock depreciated based on a geometric function
Statistics Canada and Desjardins Economic Studies

GRAPH 7

The Share of Residential Capital Stock Is Rising Continually in Canada

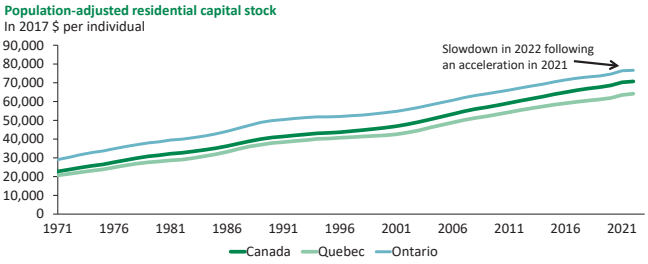


Statistics Canada and Desjardins Economic Studies

has risen continuously over the past 50 years (graph 8). This long upward trend suggests that accessibility issues could also be linked to uneven distribution and underuse of built capital among the population, rather than just a chronic lack of investment. In a recent Economic Viewpoint, we discussed short-term rentals, which reduce the availability of housing for conventional long-term use. It's also important to mention that residential capital stock doesn't just fluctuate according to the number of properties, but also their size and quality, such as the type of materials and insulation used. Additionally, household composition is changing, and more people are living alone, all of which complicates the analysis. Still, we can see that residential

GRAPH 8

Population-Adjusted Residential Capital Stock Continues to Increase



Statistics Canada and Desjardins Economic Studies

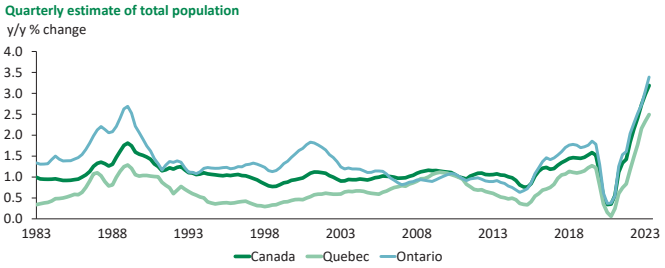
capital ratio growth slowed in 2022, especially in Ontario, which aligns with the rebound in population growth that will be discussed in the next section.

Recent Demographic Trends Are Exerting Downward Pressure on the Capital-to-Population Ratio

Population growth surged in 2022 and 2023 to its highest level in many years (graph 9). If we don't invest enough, our capital ratio could grow more slowly and potentially even decrease.

GRAPH 9

Canada's Population Growth Surged in 2023

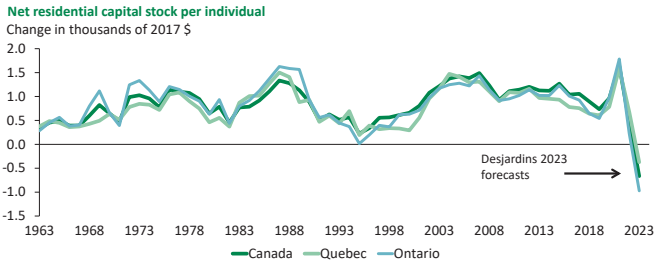


Statistics Canada and Desjardins Economic Studies

Our short-term investment prognosis is rather disappointing amid an economic slowdown and high interest rates. In 2023, residential and non-residential capital growth were likely lower than population growth in Quebec and Canada as a whole for the first time since capital stock records began. The decline in average residential capital per individual was probably particularly pronounced, which would be consistent with other indicators that show that the housing shortage problem has worsened recently (graph 10).

GRAPH 10

Net Residential Capital Stock Is Expected to Have Declined Sharply in 2023

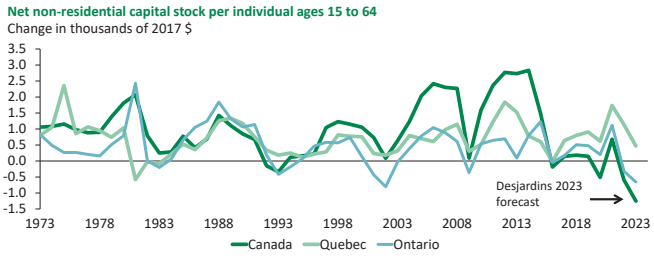


Statistics Canada and Desjardins Economic Studies

Quebec's non-residential capital stock situation in 2023 may not be as bad, especially when compared to the size of its potential worker pool (graph 11). This could help Quebec maintain some productivity momentum compared to the rest of Canada. However, this stronger performance in 2023 is unlikely to have come from higher investment growth, which was most likely lower than the Canadian average in Quebec last year. The slower growth of Quebec's population ages 15-64 is the biggest mitigating factor when comparing the province's ratio to the Canadian average.

GRAPH 11

Net Non-residential Capital Stock in Proportion to the Labour Pool Is Still Growing in Quebec



Statistics Canada and Desjardins Economic Studies

Investment Will Have to Grow Faster

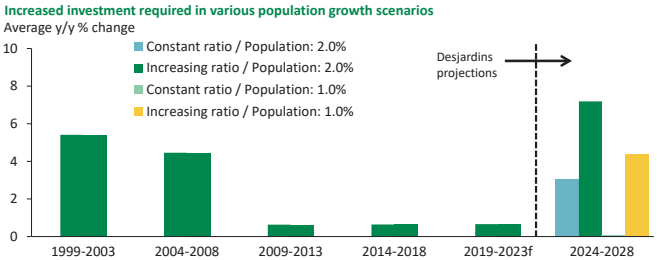
Based on these latest figures, it's clear that we'll need to ramp up our investments in the coming years to boost labour productivity and meet public demand for goods and services. Demand for some goods and services may seem lower right now due to the economic slowdown, but this isn't expected to last for several years. In addition, there's widespread need for many essential goods and services—housing, public services such as education and health, and infrastructure—which are, by definition, independent of the economic situation.

However, forecasting the necessary investments is no small feat. It requires several assumptions, including depreciation, desirable capital stock and population growth. We've assumed that the depreciation rate will converge toward the recent average. Our projections are then based on different assumptions. First, we assumed one scenario where the capital stock to population ratio is expected to remain constant and another where the ratio is expected to increase at the average pace seen over the last 20 years. We also used two separate assumptions for demographic growth. We considered one scenario with population growth of around 1% in Quebec and 1.5% in Canada as a whole between 2024 and 2028, which is in line with Statistics Canada's strong (but already exceeded) growth forecast and the immigration targets announced by the federal and provincial governments. To illustrate the potential long-term effects of the strong growth we're currently seeing, we're also including a scenario where growth remains close to its 2023 pace over the long term, at 2% in Quebec and 3% in Canada.

Many of our projected results for Quebec suggest significant increases in investment over the next few years (graph 12). The only scenario with investment growth lower than in the previous decade would be a constant capital ratio with population growth of 1%. If the goal were to maintain the growth in the capital ratio with population growth of 1%, investment would have to increase by around 4.5% per year. This is comparable to what we saw in the late 1990s and early 2000s. The goal becomes even more ambitious if we assume 2% population growth. Investment would then have to grow by over 7% per year to maintain the pace of growth of the capital-to-population ratio. We haven't seen this pace of investment growth in the last 25 years, but there are comparable data points, including around Expo 67, the Olympics and major hydro projects.

GRAPH 12

Investment Will Have to Increase to Support Quebec's Capital-to-Population Ratio

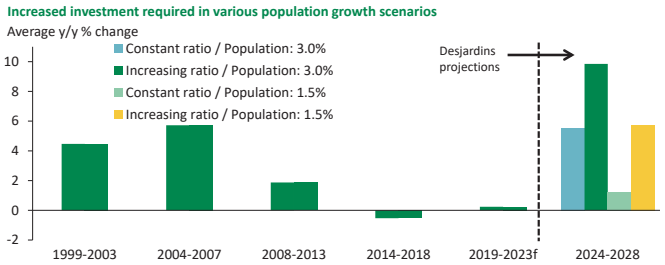


2023 forecast
Datastream and Desjardins Economic Studies

Due primarily to assumptions of higher population growth, projections for Canada as a whole show that investment has to increase even more (graph 13). The most ambitious scenario, with an increasing capital ratio and 3% population growth, would require an increase in investment of more than 9.5% per year, which is well above the comparison points with the data available.

GRAPH 13

Investment across Canada Will Have to Increase Even Further



2023 forecast
Datastream and Desjardins Economic Studies

Tough Conditions over the Next Few Years Will Make It Challenging to Maintain Capital Growth…

We simulated different scenarios to estimate the expected investment needed in the coming years. In reality, focusing on the continued growth of capital stock per individual will likely be more appropriate. Simply settling for a stable capital stock ratio could drag down future productivity gains. Prolonged periods where capital stock doesn't increase relative to the population—in Quebec or Canada as a whole—have been rare. But there are other factors at play. The next few years are likely to be dominated by the energy transition as economies strive to achieve net zero and limit global warming. This could require substantial investment in different sectors, including transportation, infrastructure, mining and energy. As a result, we expect capital stock per individual to grow and not just stabilize.

Another issue stemming from the energy transition is that some polluting production facilities may have to be decommissioned before the end of their useful life and will therefore be depreciated more quickly. Calculations that use a constant percentage of depreciation may therefore underestimate actual depreciation and the investments needed to rebuild adequate capital stock to support the economy over the long term. This is less likely to happen in Quebec, since the province already has a greener economy.

To simplify the analysis, we haven't forecasted investment needs by category. However, we're aware that there will be substantial public and private investment needs in both non-residential and residential sectors. Transportation infrastructure as well as health and education institutions will need to expand to accommodate a growing population. The situation is already critical in several sectors. That said, scenarios where population growth remains at 2% in Quebec and 3% across Canada may be less likely to occur. However, even 1% population growth in Quebec and 1.5% in Canada will generate significant capital needs. Businesses will also have to invest heavily to boost production to meet additional demand. One mitigating factor could be the introduction of disruptive technologies, such as artificial intelligence, which could significantly boost total productivity in certain sectors. We may also see existing capital transferred to higher demand sectors—converting outdated office buildings into housing, for example.

… But It's a Challenge that Must be Taken Up to Maintain our Standard of Living

The economic and social fallout from not investing enough could be serious. Productivity and wages could be impacted, and inequality that benefits capital owners would likely increase. While some progress has been made in Quebec recently, the backdrop worsened in 2023 and further efforts will be required in the coming years. The scope of the task is set to be even greater across Canada, where recent data points to more unfavourable trends in capital and productivity. Population growth will have a significant impact on investment needs. In the most likely scenario, Quebec's population will grow by almost 1% annually over the coming years, requiring a significant, but attainable, increase in investment. In Canada, the scenario of around 1.5% population growth also appears achievable, albeit more challenging. The catch-up needed to achieve net zero emissions targets—an area where there's no shortage of projects—could further increase the investment required.

Scenarios with higher population growth seem less likely but still possible. Labour shortages could cause faster population growth. However, in that case it's important to understand that even more investment would be needed to underpin productivity and meet the various capital needs of a growing population. The limit here may end up being the capacity of governments, businesses and households to finance all these investments, especially if they all occur at the same time.

Appendix - A Bit of Economic Theory

In addition to what we've been seeing empirically, the link between capital and labour has long been a theme of classic economic theory. The Cobb-Douglas equation is often used to describe the production of goods and services:

$$Y(GDP) = A * L^{\beta} * K^{\alpha}$$

Where:
L: Hours worked
K: Capital stock used in production
A: Total factor productivity
β: Work production elasticity, is < 1 due to decreasing marginal returns
α: Capital production elasticity, is < 1 due to decreasing marginal returns

While this equation simplifies reality, it also helps us identify some important insights. First, production is contingent on use of the available amount of both inputs—labour and capital—but also factor A, total factor productivity. This measure can include many items that are difficult to quantify, including technological advancement and the efficiency of the mix of production inputs. This explains why production could continue to increase even if the number of available inputs stagnates. Economic theory clearly states that, at equilibrium, compensation of inputs must be equal to their marginal product. At a macroeconomic level, compensation of labour is clearly represented by wages and other compensation paid to workers, while compensation of capital should equal the neutral interest rate. The logic behind this theoretical representation is that a business owner would be willing to borrow to invest as long as the capital's marginal product remains higher than the interest rate.

The above equation can be used to derive measures of compensation of inputs:

$$\textit{Wages = marginal product of labour} = \frac{d(Y)}{dL} = \beta \frac{(A*L^{\beta}*K^{\alpha})}{L} = \beta \frac{Y}{L}$$

$$\textit{Interest rate = marginal product of capital} = \frac{d(Y)}{dK} = \alpha \frac{(A*L^{\beta}*K^{\alpha})}{K} = \alpha \frac{Y}{K}$$

Here we see the direct relationship between the relative weight and compensation of each of the inputs in total production. Increasing the intensity of one input in production while keeping the other constant causes its compensation to decrease. However, the wages formula indicates that workers' compensation tends to be supported by additional capital, all other things equal.