



September 22, 2009

## The key to Québec's economic prosperity Boost productivity to soften the impact of the demographic shock

Unfavourable demographic trends, namely, the imminent decrease of the labour force, will have severe repercussions on Québec's potential economic growth. As demonstrated in a recent *Economic Viewpoint*<sup>1</sup> and in last July's update,<sup>2</sup> only faster productivity gains can prevent Québec's GDP from a steep decline. Should productivity continue to rise at the same pace as in the last decade, i.e. about 1% on average each year, potential GDP growth will fall to less than 1% by 2020. This is therefore a vital issue for Québec. Since demographic aging here will resemble that already underway in some European countries and in Japan, whose economy has been in near stagnation for 15 years, we must act now to lift our productivity, the cornerstone of our future prosperity.

Our analysis begins with a description of the role productivity plays in the economy, followed by a comparison of Québec's position vis-à-vis its largest trading partners. We then conclude with suggestions on how to step up productivity growth. While improvements in this regard will not be enough to avoid the negative impact of demographic aging, they will nevertheless help contain the damage. Failure to act will imperil the circle of wealth creation, resulting in a decline in Québécois' standard of living.

Both the public and private sectors will have to do their part in the productivity challenge. First, the governments must create an environment conducive to, among other things, innovation, education and investment. Businesses, together with their workers, must also form an integral part of the process: their growth strategy must include ways to raise productivity. Businesses play a key role because ultimately, their actions will make the difference. It is not just about creating public policies to foster a climate conducive to productivity, companies must also seize opportunities. We will suggest concrete measures to guide them. This edition of *Economic Viewpoint* is different from most studies published to date on this topic in that it analyzes both aspects (governments and business).

<sup>1</sup> See *Economic Viewpoint* "Impact of the demographic shock on Québec's economy – Slowdown in GDP growth will have far-reaching consequences" May 28, 2009.

<sup>2</sup> See *Economic Viewpoint* "Demographic shock: An update – It remains a problem for the next fifteen years!," July 22, 2009.

### PRODUCTIVITY: A DRIVER OF ECONOMIC GROWTH

In essence, three elements fuel economic growth. The first is the labour force: the more workers, the greater the output potential. The second is capital, which is related to investments made to increase production capacity or efficiency. And third is productivity gains, i.e. the economy's ability to produce more with the same quantity of labour and capital. There is a close link between economic growth and productivity, which can be measured in different ways (box 1 on page 2).

The first driver of economic expansion, the labour force, will soon stop growing in Québec and slowly begin declining as a massive number of baby boomers head into retirement. Since this baby boom, which took place in the province between 1946 and 1966, was more pronounced here than elsewhere in North America, the exodus of this cohort will have a greater impact on the labour pool, which is expected to contract in Québec but only slow its growth pace in Ontario and in Canada overall. According to the latest projections of the Insti-

**François Dupuis**  
Vice-President and Chief Economist

**Yves St-Maurice**  
Director and Deputy Chief Economist

**Hélène Bégin**  
Senior Economist

**Jean-Michel Goulet**  
Economist

**Hendrix Vachon**  
Economist

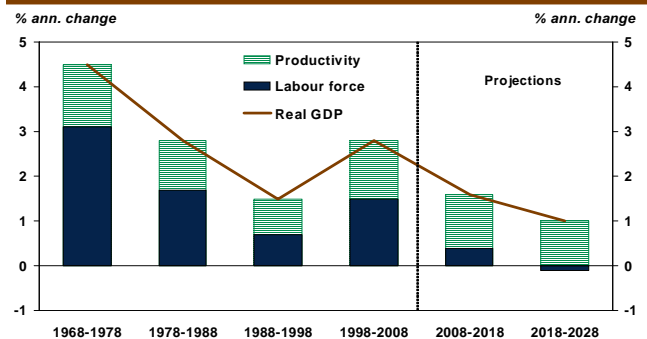
418-835-2450 or 1 866 835-8444, ext. 2450  
E-mail: [desjardins.economics@desjardins.com](mailto:desjardins.economics@desjardins.com)

**NOTE TO READERS:** The letters **k**, **M** and **B** are used in texts and tables to refer to thousands, millions and billions respectively.

**IMPORTANT:** This document is based on public information, obtained from sources that are deemed to be reliable. Desjardins Group in no way guarantees that the information is complete or accurate. The document is provided solely for information purposes and does not constitute an offer or solicitation for purchase or sale. The document may under no circumstances be construed as a commitment by Desjardins Group, which takes no responsibility for the consequences of any decision made based on the information herein. The prices and rates shown are for information purposes only as they may change at any time based on market conditions. Past returns are no guarantee of future performance, and Desjardins Group does not hereby purport to provide any investment advice. The opinions and forecasts contained herein are, unless otherwise indicated, those of the document's authors and do not represent the official position of Desjardins Group. Copyright © 2009, Desjardins Group. All rights reserved.

tut de la statistique du Québec, the working-age population (15-to-64-year-olds) will begin to decline in 2014, and Québec's economic growth potential, which has averaged about 2% for the last five years, will do the same. This growth was achieved as the result of an annual increase of 1% in the workforce and a 1% increase in the province's productivity (graph 1). Since real GDP growth is fuelled by both workforce growth and productivity gains, the economy's growth potential will lose one of its drivers. Given the expected stagnation of the workforce and its subsequent decline, productivity will have to grow by at least 2% per year to prevent economic growth from weakening. However, before we can determine the best ways to step up this growth, we must first look at Québec's situation today.

**Graph 1 – Québec's economic growth will soon depend entirely on productivity gains\***



\* Productivity is calculated as a residual (change in real GDP minus change in the labour force).  
The assumption of constant productivity (1998-2008) was used for the projections.  
Sources: Conference Board, Statistics Canada and Desjardins, Economic Studies

**Box 1**  
**Measures of productivity**

The concept of labour productivity is the most widely used due to the availability of indicators and the ease with which they can be interpreted. Labour productivity is a measure of real GDP per hour worked, in other words, an economy's output for each hour worked. Thus, if the quantity of goods produced or services rendered in one hour of work increases, it is because productivity improved. Conversely, a decrease means lower production efficiency. Most of the productivity calculations in this analysis refer to labour productivity. When another metric is used, it will be indicated.

The second metric, multifactor productivity, refers to efficiency gains and measures the use of labour and capital in the production process. Multifactor productivity is a residual: it measures what is left after subtracting the contribution of capital and labour to production growth. Over time, multifactor productivity growth mainly reflects the contribution of business innovation. Multifactor productivity cannot be observed directly: we can only measure its fluctuation indirectly. Theoretically, the percent change in production (Y) can be explained by the percent change in the quantity of labour (L) and capital (K), plus then by the percent change in multifactor productivity (MFP). As the following equation shows, when we have data on production, labour and capital, we can obtain a residual that approximates the percentage change in multifactor productivity. Coefficients  $\alpha$  and  $\beta$  equal, respectively, the relative weight of capital and labour used in the production process.

$$\frac{\Delta Y}{Y} = \alpha \frac{\Delta K}{K} + \beta \frac{\Delta L}{L} + \frac{\Delta MFP}{MFP} \Leftrightarrow \frac{\Delta MFP}{MFP} = \frac{\Delta Y}{Y} - \alpha \frac{\Delta K}{K} - \beta \frac{\Delta L}{L}$$

This approach therefore measures the efficiency with which labour and capital are used in the production process. However, the drawback of this formula is that it is complicated, which can make it difficult to compare Canada at the international or provincial level. Consequently, most of the productivity figures presented in this *Economic Viewpoint* refer to real GDP per hour worked.

That said, multifactor productivity estimates were made for Québec and Ontario to establish an approximate point of comparison with Canada as a whole. Coefficients  $\alpha$  and  $\beta$ , which are only available for the country, were used at the provincial level. The capital factor also had to be estimated based on certain Canadian statistics. Although the capital stock is available for each province, some adjustments are not applied to the provincial set. Despite these shortcomings, our estimates allowed us to break down Québec's and Ontario's economic growth in order to determine the contribution of each production factor: labour, capital and the efficiency gains that can be linked to innovation. However, since they are based on estimates, the results must be interpreted with caution. Still, this approach allows for a more in-depth comparative analysis of Québec's productivity vis-à-vis its neighbours. The results are presented on pages 8 and 9.

According to the economic theory, a decrease in the labour pool can cause a systematic improvement in productivity (box 2). Since Québec's particularly unfavourable demographic situation will shortly lead to a labour shortage, productivity may simply improve due to more intensive use of capital, to the detriment of the workforce. These gains, which appear easy to achieve, nevertheless have their limitations. Genuine efforts will have to be made and solutions found to boost our productivity. While the governments have an important role to play in creating an overall positive environment, the role of business and workers is no less important. As such, we will offer concrete suggestions to guide Québec companies and employees in their quest for greater productivity.

#### OUR LIVING STANDARD DEPENDS ON PRODUCTIVITY

For most industrialized nations, and especially for Québec, productivity will have to grow faster if economic growth is not to be totally derailed by the negative demographic trend. However, the implications are more far reaching: productivity directly affects wages and living standard. Ultimately, all wealth creation, and by extension, a nation's prosperity, depends on it. That said, productivity is not the only way to improve the living standard. At the international level, the relationship between productivity and wages (including benefits), is incontrovertible. Among the member countries of Organization of Economic Co-operation and Development

#### Box 2

##### Productivity gains: easy to achieve?

According to economic theory, part of the productivity gains required for real GDP to grow should be achieved almost automatically. In fact, considering that marginal labour productivity usually drops with the number of workers,<sup>3</sup> a reduction in the workforce will translate into a higher productivity ratio. In other words, labour is used more efficiently with the result that output per worker rises.

This conclusion can be demonstrated analytically. The concept of labour productivity discussed in this *Economic Viewpoint* can be expressed as the ratio between total output (Y) and the quantity of labour (L) available. The output function with constant returns to scale is,  $Y = AL^\alpha K^{1-\alpha}$  where "A" is a variable measuring the degree of technological development, "L" is the quantity of labour available and "K" is the quantity of productive capital available. Labour productivity (LP) is then equal to  $\frac{AL^\alpha K^{1-\alpha}}{L}$ .

By calculating the change in the labour productivity ratio following a the marginal change in the labour factor, we obtain a mathematical equation with a negative sign, which means that an increase in the labour factor reduces the labour productivity ratio while a decrease in labour increases the ratio.

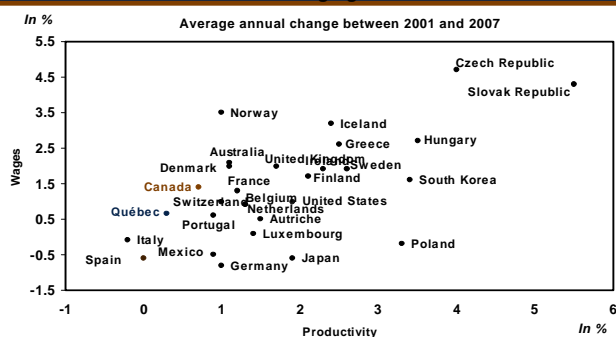
$$\frac{\partial(LP)}{\partial L} \cong \frac{\Delta(LP)}{\Delta(L)} = (\alpha - 1) \frac{AL^\alpha K^{1-\alpha}}{L^2} < 0, \text{ since } \alpha < 1.$$

The improvement in productivity per worker obtained following a reduction in labour is not sufficient to completely fill the void. In fact, a numerical demonstration can be made for Canada by replacing the variables in these theoretical equations with hypothetical values. According to data from the OECD, coefficient  $\alpha$ , which equals the labour cost out of the total cost of the production factors, was 0.774 on average in Canada between 2001 and 2007. By assigning this value to coefficient  $\alpha$ , an initial value equal to 100 for labour, and then a fixed value of 1 for the other variables, we obtain a ratio of 0.3532 output unit per worker unit. However, by decreasing the amount of available labour by 1% (the quantity of labour decreases from 100 to 99), the ratio rises to 0.3540 output unit per worker unit, an increase of about 0.23% in productivity for a decrease of 1% in available labour. This 1% decline in the workforce therefore implies a net decrease of approximately 0.77% in the nation's rate of economic growth. The same observation can be made with respect to Québec: a decrease in the labour factor does not automatically mean sufficient productivity gains. More concrete means must therefore be found to lift productivity in Québec and prevent the province's real GDP growth from weakening.

<sup>3</sup> All other things being equal.

(OECD),<sup>4</sup> those with the strongest productivity gains, namely, some Eastern European countries and South Korea, also show the highest wage increases (graph 2). Of course, the fact that the economies of these countries are less developed makes productivity improvement easier to achieve. Theoretically, the productivity gains of emerging economies are extremely high during the initial phases of their development but taper off as they approach a certain maturity. In industrialized economies, additional productivity gains are harder to come by, and consequently, wage increases are lower; hence the importance of investing massively but even more importantly, focusing on innovation, technological development, improving the efficiency of production processes, education, and professional development for workers.

**Graph 2 – Close relationship between productivity gains and real wage growth**



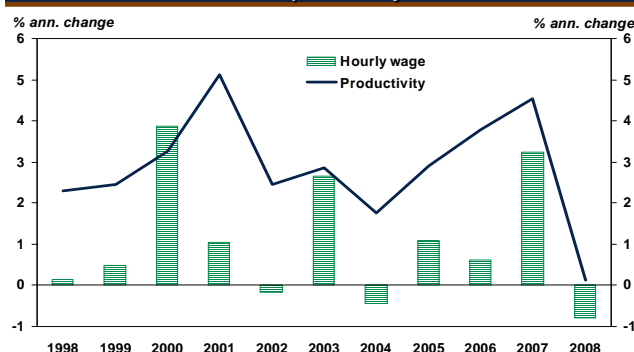
\* Productivity equals output per worker, and wages are also calculated per worker.  
Sources: Organization for Economic Co-operation and Development, Statistics Canada, Institut de la statistique du Québec, and Desjardins, Economic Studies

When it comes to their position among the world's main industrialized economies, Québec and Canada have nothing to crow about. Productivity gains were less than 1% between 2001 and 2007, translating into wage increases of about 1%, excluding inflation. The Fortin Report<sup>5</sup> has shown that in the long run, a 1% reduction in the productivity gap will translate into a 1% reduction in the compensation gap (the opposite also holds true). It is therefore clear that improved productivity

means lower costs for businesses, which frees up money for more generous raises and which usually leads to a higher standard of living.<sup>6</sup>

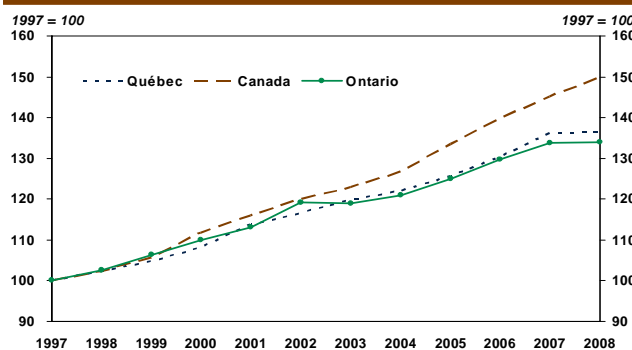
There is also a very close correlation between productivity and hourly pay, in real terms. It is even more accurate than total compensation since it allows us to compare the cost of an hour of work, regardless of the number of workers or the number of hours worked by each individual. The broader concept of wages used earlier has the drawback of being influenced by these two elements. The fact is that for the last decade or so, real hourly wages and productivity have increased at a similar pace in Québec (graph 3). Since the productivity gains were significantly lower than for the nation as a whole, so was the increase in hourly wage (graphs 4 and 5). For the same period, productivity grew at about the same rate in Québec and Ontario, as did wages.

**Graph 3 – Real hourly wage in Québec usually moves in lockstep with productivity**



Sources: Statistics Canada and Desjardins, Economic Studies

**Graph 4 – Labour productivity gains in Québec and Ontario are weaker than in Canada**



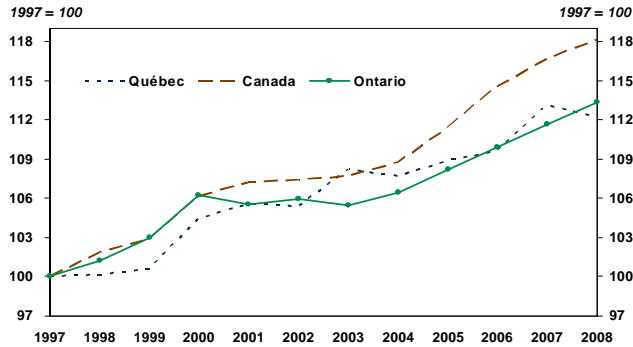
Sources: Statistics Canada and Desjardins, Economic Studies

<sup>4</sup> The OECD has 30 member countries: Australia, Austria, Belgium, Canada, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Korea, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Spain, Sweden, Switzerland, Turkey, the United Kingdom, and the United States.

<sup>5</sup> FORTIN, Pierre, CORRIVEAU, Andrée and BOIVIN, Jean, "L'investissement au Québec: on est pour" Report of the Groupe de travail sur l'investissement des entreprises, published at the request of the Government of Québec, March 2008.

<sup>6</sup> Living standard is typically measured by GDP per capita and refers to a global concept of wealth. This calculation, however, does not take into account individual well-being, which can, for example, be affected by gross social inequality. Quality of life is also not considered. The United Nations' Human Development Index, which simultaneously measures a nation's economic and social success, was created to compensate for these shortcomings.

**Graph 5 – Real hourly wage not growing as fast in Québec and Ontario**

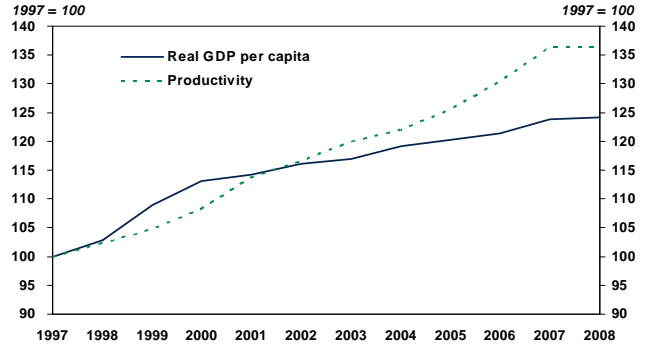


Sources: Statistics Canada and Desjardins, Economic Studies

For many, labour productivity is synonymous with job losses. If everyone became more productive, fewer workers would be needed to do the same job. This may very well be the case in some companies or industries, which won't hesitate to cut labour costs if it means becoming more competitive abroad, where the competition has recently become more intense. In a context of growing globalization, some companies find their very survival threatened, and their future hinges on the ability to boost productivity to the level needed to stay in the game. Nevertheless, the jobs preserved and the ones sometimes created are better paying because they bring greater added value to the company.<sup>7</sup> These better paid workers have more money to spend on goods and services, which in turn fuels job creation in other sectors, particularly services.

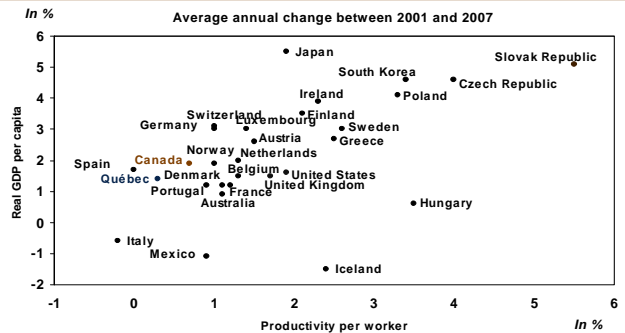
Economic theory further postulates that real wage must equal the marginal product of labour. If wages are too high in relation to productivity, it is in the company's interest to hire fewer workers. Conversely, if they are lower, then the company would do well to expand its payroll. At the end of the day, greater productivity usually leads to bigger salary raises, which improves the nation's overall standard of living. Just as for most industrialized economies, there is a very strong correlation between increased productivity and living standard in Québec (graph 6). In the long run, countries with the strongest growth in collective wealth also show the greatest productivity gains (graph 7).

**Graph 6 – Productivity growth has raised Québec's living standard in Québec**



Sources: Statistics Canada and Desjardins, Economic Studies

**Graph 7 – Close relationship between improvement in living standard and productivity gains\***



\* Productivity equals output per worker  
Sources: Organization for Economic Co-operation and Development and Desjardins, Economic Studies

**CANADA'S GLOBAL POSITION IS DWINDLING**

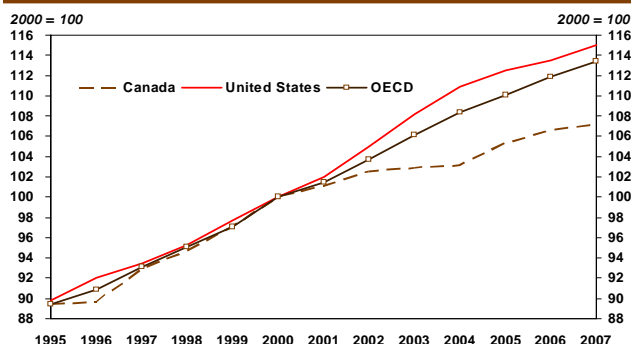
Productivity is usually a good indicator of an economy's health or a nation's wealth. This measure of efficiency is essentially used to compare performance between countries or provinces. Unless otherwise indicated, the concept of labour productivity used in this analysis refers to real GDP per hour worked. Productivity growth is of vital importance to the manufacturing sector, particularly in light of the very strong Canadian dollar and the stiffer global competition delivered of late. In order to prevent its competitive position from deteriorating further, and in order to maintain its relative standard of living, Canada must absolutely achieve productivity gains that are at least comparable to those of its main trading partners.

<sup>7</sup> KOZHAYA, NORMA, "La productivité: comment l'améliorer pour assurer un meilleur niveau de vie aux Québécois", Conseil du patronat du Québec, May 2008.

We will first look at how Canada has fared in this regard over the last few years. Where there are weaknesses, we must step up our efforts not only to catch up but to try and overtake our neighbours, in other words, close the gap and then become a front runner.

At the international level, the OECD member countries offer the largest and most pertinent reference point for comparison. Although productivity gains in North America progressed at the same pace as those of the OECD from 1995 to 2000, the gap has widened sharply since then. Productivity has grown more rapidly in the U.S. while Canada has failed to keep up with most of the other OECD countries (graph 8) and even the other G7 nations. Canada is therefore consistently behind at the international level, a situation that has gone from bad to worse since the beginning of the decade. The best performance of the U.S. and several countries comparable to Canada, is the result of massive ICT (information and communication technologies) investments, which accelerated productivity growth. According to a recent report by an expert panel,<sup>8</sup> Canada's lagging productivity growth is mainly due to a low level of innovation. This will be discussed in more detail later on.

**Graph 8 – Canadian productivity lags from an international perspective**



Sources: Organization for Economic Co-operation and Development and Desjardins, Economic Studies

Canada's slower productivity growth since the early 2000s has also been accompanied by a loss of competitiveness abroad (table 1). The ranking compiled by the World Economic Forum, which considers many aspects of competitiveness, speaks volumes in this regard. Whereas at the beginning of the decade Canada ranked seventh out of the 100-odd countries surveyed, it has fallen to ninth place this year. However, thanks to sharp productivity growth, the U.S. continues to turn in an enviable performance despite being hit by two recessions since the beginning of the decade.

**Table 1 - Canada's international competitiveness is slipping**

Country	2000 Ranking	2009 Ranking	2009 Index
Switzerland	10	1	5.60
United States	1	2	5.59
Singapore	2	3	5.55
Sweden	13	4	5.51
Denmark	14	5	5.46
Finland	6	6	5.43
Germany	15	7	5.37
Japan	21	8	5.37
Canada	7	9	5.33
Netherlands	4	10	5.32

Sources: World Economic Forum and Desjardins, Economic Studies

The World Economic Forum's competitiveness index is based on various factors used to assess a country's overall economic climate. At the beginning of the decade, these factors were grouped in three categories: the quality of the macroeconomic environment, the state of public institutions, and the level of technological progress. The number of categories has increased since, reaching 12 in 2009 and including, among others, innovation. The advantage of this global index is that it rounds out the productivity assessment in order to determine Canada's competitive position in the world and assess its evolution over the years. Indeed, the OECD has found that boosting productivity growth in tune with improving the overall business environment.<sup>9</sup>

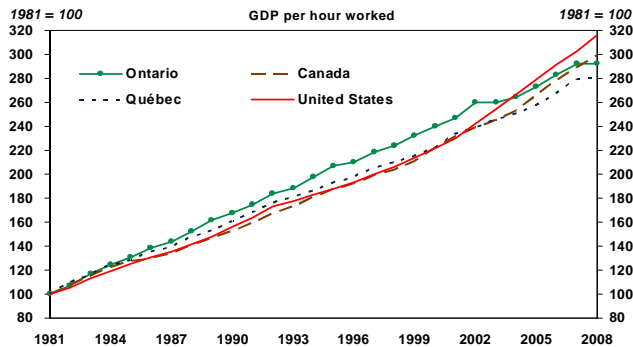
**IS QUÉBEC FARING BETTER?**

Canada's international productivity ranking has plummeted in the last decade. The situation is even worse for Québec, which until the early 2000s, pretty much kept pace with Canada and the U.S. while Ontario regularly beat out its principal trading partners (graph 9 on page 7). Since the beginning of the decade, Québec has lagged behind Canada and lost even more ground in relation to the U.S. The gap between Québec and its neighbours has therefore widened sharply (graph 10 on page 7). Last year, each hour of work in the U.S. produced the equivalent of US\$50.70, compared to US\$44.80 in Canada, US\$41.80 in Ontario and US\$39.60 in Québec.<sup>10</sup> Since productivity grows slower in Québec, the gap in terms of output per hour worked has been widening disturbingly for more than a decade.

<sup>9</sup> OECD, Policy Brief, Economic Survey of Canada, June 2006.

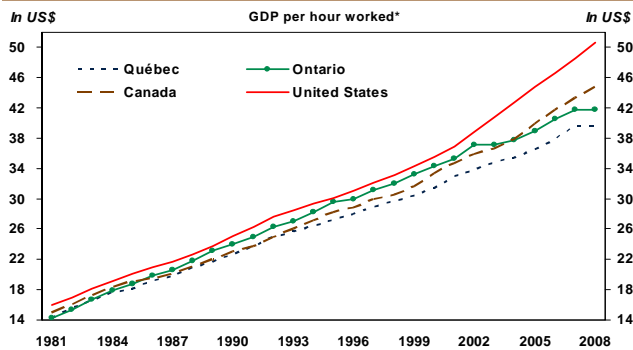
<sup>10</sup> Calculations by Jean-Pierre Maynard, Chief, Labour Productivity Section, Statistics Canada. Nominal GDP is adjusted to purchasing-power parity.

**Graph 9 – Québec trails in productivity growth**



Sources: Statistics Canada and Desjardins, Economic Studies

**Graph 10 – Labour productivity level: Québec is not keeping up with its neighbours**



\*Data adjusted to purchasing-power parity.  
Sources: Statistics Canada and Desjardins, Economic Studies

As shown previously, Canada’s anaemic productivity gains since the beginning of the 2000s have weakened the country’s competitive position abroad. Since Québec has also lost ground vis-à-vis North America’s major players automatically means that its international ranking suffers as well. As mentioned earlier, in the long run, labour productivity is the most decisive factor for the living standard of an economy or a nation. If Québec is to avoid growing poorer in relation to the world’s top industrialized nations, it must quickly step up its efforts to raise productivity.

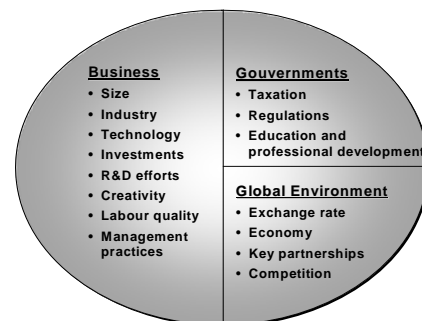
The ability to do this depends on a number of factors, the most important being, among others, innovation, level of education, workforce training, machinery and equipment investment, and the fiscal and regulatory regimes. Business size, the economy’s industrial structure, worker flexibility and according to some, even the unionization rate, can also affect how fast productivity improves. As such, we must study some of these aspects in order to pinpoint any weaknesses that could hinder productivity growth in Québec.

**INNOVATION: A KEY ROLE**

Among the various factors that affect productivity, innovation is the most important. Innovation is what allows the economy to increase the output of goods and services using fixed quantities of resources. According to the Council of Canadian Academies report,<sup>11</sup> innovation is defined as new and better ways of creating more wealth. Companies boost their competitiveness because they use their resources more efficiently. Innovation is not limited to products; it also encompasses process improvements.

There are two types of innovation. The first, “radical” innovation, refers to major discoveries that cause a dramatic change in how the economy operates, for example, the invention of the automobile, the PC and the microchip. These technologies were deployed around the globe, resulting in a briefly spectacular leap in productivity. The second type, which is not born out of a spontaneous idea, is “incremental” innovation, which is within the reach of all companies and which explains most of the productivity gains achieved in recent years. This form of innovation refers to improvements made to production processes (goods or services), either at the design, marketing or distribution stage. Innovation therefore goes beyond invention and must be an integral part of business strategy. According to this expert panel, productivity growth is largely driven by continuous improvement rather than inventions. Innovation also depends on other factors, all of them inter-related (diagram 1).

**Diagram 1 – Innovation depends on a combination of factors: government and business both play a role**



Sources: Thales Canada Inc. and Desjardins, Economic Studies

<sup>11</sup> Canadian Council of Academies, “Innovation and Business Strategies: Why Canada Falls Short,” abridged version of report, April 2009.

Among the other factors that have a strong bearing on innovation and productivity gains are management practices. In-depth studies conducted by McKinsey & Company on this topic<sup>12-13</sup> conclude that good management techniques have a greater impact on innovation and productivity gains than other factors such as geography, regulation or competitive intensity. This could be a worthwhile path for Québec companies to explore. Recent innovative practices include the just-in-time approach, the development of tools to track a product through each step of the production cycle and to measure performance and quality, the ability of companies to attract and retain talent, and new ways of rewarding employee performance. However, there is no miracle solution. A company's size, activity sector, employee make-up and other factors often call for different management practices, which are just as effective.

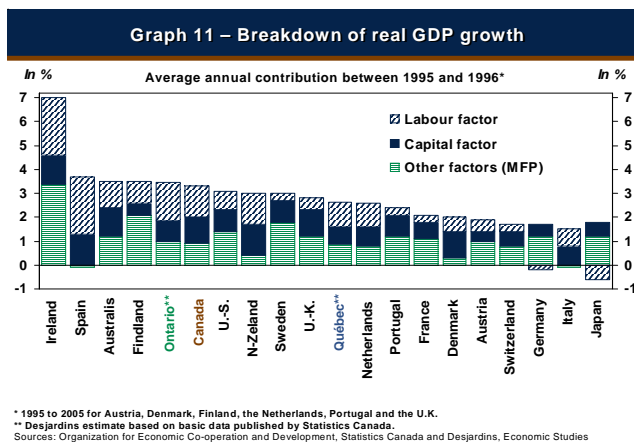
### INNOVATION ALSO CALLS FOR CREATIVITY

A business can find ways to be more efficient at every step of its global process: raw material procurement, product design, production, marketing, shipping, and even after-sales service. The goal must be to be as competitive as possible at every step of the production process. The quest for best practices means also enlisting the collaboration of suppliers, directly involved at the beginning of the global production process. Innovation also hinges on the ability of employees to identify, and change if necessary, ways of doing things that will boost efficiency or improve the quality or originality of the company's product or service. Beyond the R&D spending and investments in machinery and equipment, creativity, which is extremely hard to measure, can make the difference between strong and weak productivity. Governments can set up conditions conducive to investment and R&D, but it is also up to businesses to create an environment that fosters the emergence of new ideas apt to enhance their competitiveness and that of the country as a whole.

However, creativity and the overall level of innovation are difficult for companies to measure and even more so for an economy. In order to determine Canada's relative performance in the world or to see how Québec and Ontario stack up against

their neighbours, we usually limit ourselves to a few directly observable indicators such as R&D expenditures and machinery and equipment investment. However, since our earlier analysis of these indicators yielded an incomplete picture of the level of innovation, we performed more in-depth calculations of multifactor productivity at the provincial level. This concept also refers to the overall level of innovation, i.e. the increase in output that cannot be explained by the contribution of capital or labour.

At the international level, the calculations are well established. A comparison between Canada and 18 OECD countries<sup>14</sup> reveals a significant weakness in the area of innovation. From 1995 to 2006, Canada ranked favourably in relation to the world's principal industrialized nations in terms of economic growth. A breakdown of this growth shows a satisfactory contribution of the capital and labour production factors but a serious weakness in terms of efficiency gains (multifactor productivity). As the ranking shows (graph 11), 11 out of the 18 countries outperformed Canada in this regard. The demographic aging, which will affect Canada in the years ahead, could sharply slow the contribution of the labour factor. If insufficient efforts are made to boost innovation, Canada's international ranking in terms of real GDP growth can only fall.



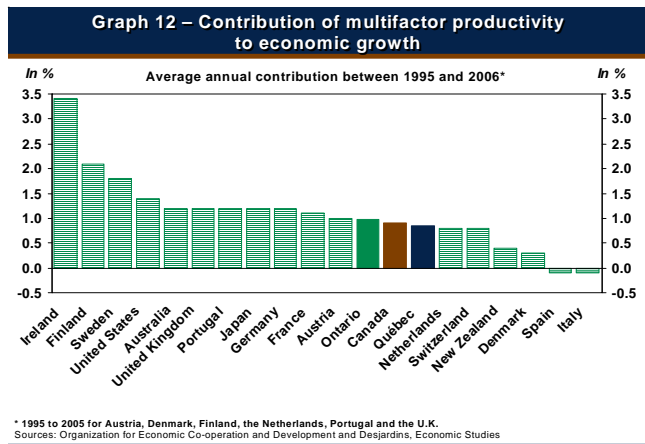
<sup>12</sup> Stephen J. Dorgan, John J. Dowdy, and Thomas M. Rippin. "The link between management and productivity, McKinsey Quarterly", February 2006.

<sup>13</sup> Stephen J. Dorgan and John Dowdy. "How good management raises productivity," McKinsey Quarterly, November 2002.

<sup>14</sup> Although the OECD now has 30 members, the comparison was limited to 18 nations whose economic structure more closely resembles Canada's.

As for Québec and Ontario, the multifactor productivity estimates must be interpreted with caution (box 1 on page 2). That said, they do show that the efficiency gains, largely due to innovation, are similar to the Canadian figures for the same period. Given the aging population, labour's contribution is projected to slow going forward in Ontario and turn negative in Québec, as has been the case for over a decade in Japan. Consequently, we must redouble our efforts to increase innovation in order to prevent economic growth from drastically decreasing.

Over the last few years, a number of Scandinavian countries began shifting to an innovation driven economic strategy, a move that breathed new life into their economies. Ireland, Sweden and Finland stand out in this regard, as the contribution of multifactor productivity shows (graph 12). In Finland's case, the shift was prompted by the severe economic crisis in 1991. "Through the concerted effort of the government and the business sector, Finland committed to transform its economy into one of the most technologically advanced in the world. Finland's experience shows that a concerted strategy to focus resources on innovative activity and investments, and to nurture globally oriented national companies and sectors, can transform a national economy from laggard to world leader in a remarkably short period of time."<sup>15</sup>



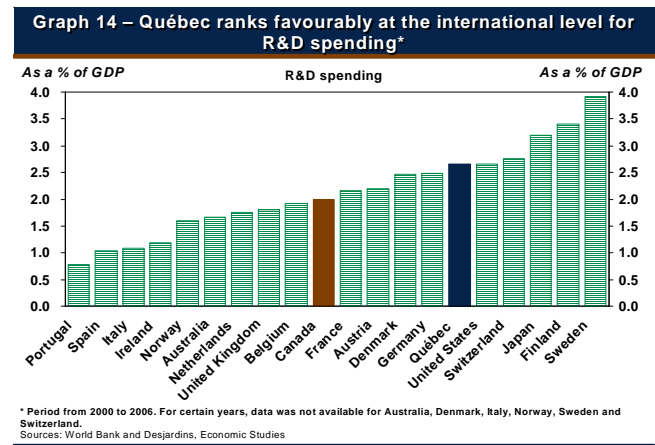
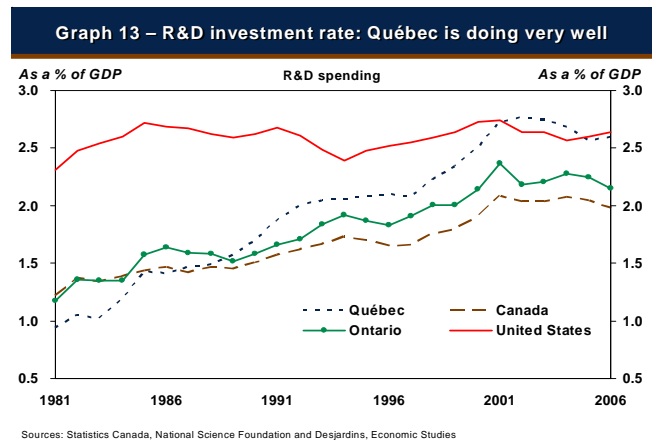
How does Québec fare on the innovation front? Beyond the intricate multifactor productivity calculations, which provide a good approximation of an economy's level of innovation, more readily available indicators such as R&D spending and machinery and equipment investment provide a fuller picture and complete the assessment that will guide our recommendations for improvement.

<sup>15</sup> Extract from Box A, p. 8, of the report of the Council of Canadian Academies, "Innovation and Business Strategy: Why Canada Falls Short," June 2009.

**QUÉBEC IS DOING WELL IN R&D**

According to an OECD study,<sup>16</sup> a sustained increase of 0.1% in R&D spending (in relation to the economy's size) raises real GDP per capita by about 1.2% over the long run. R&D spending translates not only into productivity gains for the innovative company but also for all those that subsequently implement the new technologies spawned by this research effort. R&D often leads to the development of new products or production processes.

In this regard, Québec fares well, and in fact, this type of spending even picked up in the second half of the '90s. Moreover, in the last few years, when the size of its economy is factored in, the province has been outperforming Canada and Ontario and doing nearly as well as the U.S. (graph 13). From 2000 to 2006, a period for which international performance indicators are available, Québec performed respectably, tying with the U.S. (graph 14). This performance stems in part



<sup>16</sup> OECD, "Comprendre la croissance économique : analyse au niveau macroéconomique, au niveau sectoriel et au niveau de l'entreprise," 2004, p. 50.

from its sizable pharmaceutical sector, one of the most R&D intensive industries in the province. The hefty amounts invested in this industry inflate the R&D spending figure, but this does not always translate into new drugs, which somewhat skews the potential benefits of innovation for the economy.

The province's tax regime, which stands out for its tax credits, is also surely behind these intensive research efforts. The Québec government's policies have created a positive environment for research and development. All things considered, Québec is one of the best places in North America to conduct R&D, despite the fact that many U.S. states offer subsidies and tax credits. These tax incentives are well worth continuing since R&D contributes directly to productivity. That said, this measure cannot alone lead to the kind of productivity gains found in the U.S.

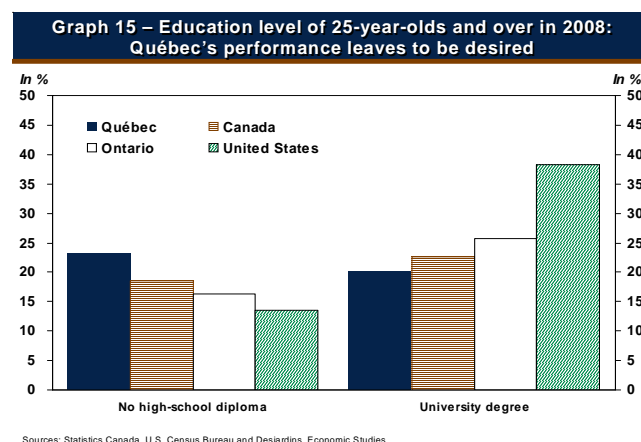
When research bears fruit, it must be find its way to industry in order for the innovation investment to translate into genuine productivity gains. To this end, we need more partnerships between business and universities, public and private laboratories, and industrial researchers. And within companies, the R&D teams must work closely with employees to better target their projects and ensure optimal application of their work. The amounts invested in research must yield tangible results in order to make a difference at the productivity level. Although Québec is keeping up in terms of R&D spending, better application of the discoveries in industry could make companies even more productive.

### INNOVATION REQUIRES KNOWLEDGE

One of the best ways to foster innovation, and by extension, productivity, is to have a highly qualified workforce. Indeed, human capital is a springboard for an economy. Education plays a role in worker competency, but so does training, which ensures employee knowledge remains current in a fast-changing and increasingly competitive world, characterized by less and less trade barriers and a recent new wave of free-trade agreements between various countries. While the government must ensure the quality of education, businesses must also do their part by offering professional development. And at the individual level, employees must always strive to do better and remain open to innovation and change.

The Quiet Revolution of the 1960s allowed Québec to catch up in education. The province then made its mark in the new economy by becoming a world leader in such fields as aeronautics and video gaming. However, although Québec

has made tremendous progress in the last 50 years on the education front, it is still lacking in some respects. For example, more than 20% of 25-year-olds and over have not finished high school. This figure is much lower in Ontario, Canada and the U.S. (graph 15). Québec also trails in university graduates despite its extremely low tuition fees. In fact, only about 20% of Québécois obtain a university degree. This number of graduates is higher in Ontario and Canada overall and almost twice as high in the U.S., with the result that America enters the game with a much bigger pool of highly qualified workers, giving it an edge in terms of innovation and explaining its stronger productivity growth. Hence the need to quickly resolve Québec's school dropout problem. In fact, the Plan recently tabled by the Québec government goes in this direction<sup>17</sup>.



Over the last few years, Québec's precarious public finances have affected the education sector. As a result of chronic underfunding, teaching and research quality has suffered in Québec's universities, which make up much of the province's scientific base.<sup>18</sup> Research work can help businesses advance technologically, among other things. Through the dissemination and creation of knowledge, universities play a key role in lifting the economy's productivity.<sup>19</sup> Consequently, the government should make education a priority in order to better prepare our youth to take up the immense economic challenges awaiting them. This does not preclude raising university tuition, which should be accompanied by a greater contribution from the government. This is a choice society

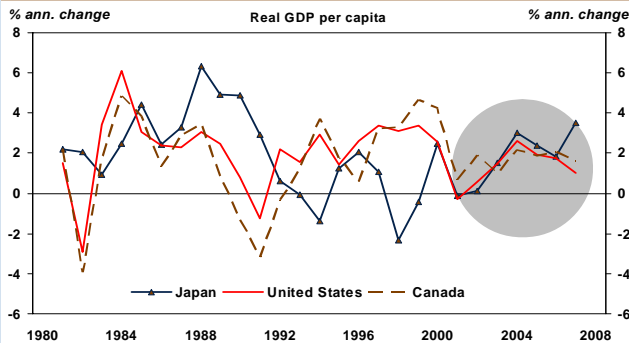
<sup>17</sup> Government of Québec, Ministère de l'Éducation, du Loisir et du Sport, "L'école j'y tiens – Tous ensemble pour la réussite scolaire," September 2009.

<sup>18</sup> Bernard Landry, "Regard sur les enjeux économiques du Québec," November 2004.

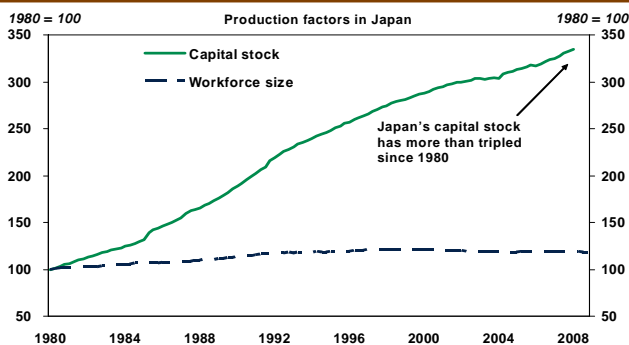
<sup>19</sup> See *Economic Viewpoint* "Our future prosperity hinges on our universities - By disseminating and generating knowledge, universities are essential to increasing productivity," November 19, 2008

**Box 3**
**A demographic shock does not necessarily mean a decrease in living standard**  
**Greater capital spending could save the day**

It is interesting to note that despite the decrease in Japan's workforce, the progress of the country's real GDP per capita (a measure of living standard) remains comparable to that of other countries, for example, Canada and the U.S. (graph 16). The assumption that an aging population will have negative consequences on the other determinants of living standard growth does not hold up in the case of Japan, which has managed to keep its productive capital stock growing at a steady pace over the last 30 years despite a workforce that has levelled off and recently begun to shrink (graph 17).

**Graph 16 – Real GDP per capita growth in Japan is not affected by demographic aging**


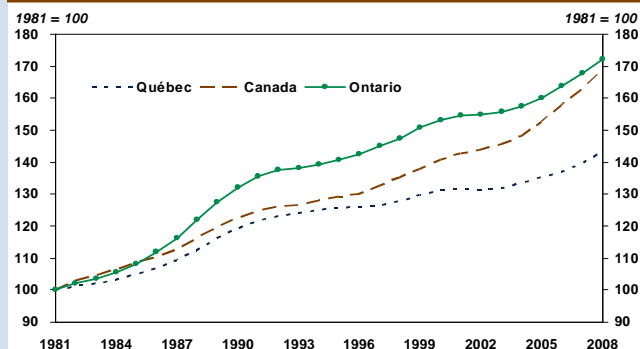
Sources: Datastream and Desjardins, Economic Studies

**Graph 17 – For lack of workers, an increase in capital can ensure economic growth and living standard**


Sources: Statistics Bureau of MIC and Desjardins, Economic Studies

Québec, whose labour pool (15-to-64-year-olds) is expected to ebb and begin shrinking in 2014, will have more trouble raising its living standard, as measured by GDP per capita, like before. According to recent trends, the capital stock is growing slower in Québec (graph 18). However, there are clearly opportunities to offset the projected labour shortage. Québec's next-door neighbours are already much more successful in this regard.

Québec, whose labour pool (15-to-64-year-olds) is expected to ebb and begin shrinking in 2014, will have more trouble raising its living standard, as measured by GDP per capita, like before. According to recent trends, the capital stock is growing slower in Québec (graph 18). However, there are clearly opportunities to offset the projected labour shortage. Québec's next-door neighbours are already much more successful in this regard.

**Graph 18 – Capital stock increasing at a slower pace in Québec than elsewhere in the country**


Sources: Statistics Canada and Desjardins, Economic Studies

must make. Choosing education is looking to the future and encouraging innovation based on the knowledge economy and fundamental research.

**WEAK INVESTMENT HARMS PRODUCTIVITY**

In order to assess an economy's ability to raise productivity, we must look at its machinery and equipment investments. Although capital investments (buildings) also plays a role, the amounts spent directly to improve each production step are the most important for productivity gains since they help increase efficiency, which in turn makes companies more competitive. By allowing the productive capital stock to increase, investments are also a way to make sure the living standard continues to rise despite the expected decline in the workforce (box 3).

According to the Fortin report, Québec's global ranking in machinery and equipment investments is not impressive. In the first half of the 2000s, the relative weight of investments in production equipment was extremely low, with Québec placing 19th out of 21 OECD member nations. It is therefore not surprising that the province is constantly behind in productivity. Closer to home, when Québec's performance is compared with that of the other provinces and the U.S.,<sup>20</sup> the picture is just as gloomy. Over a period of five years, Québec was beat out by everyone except Newfoundland and British

<sup>20</sup> See *Economic Viewpoint* "Québec's economy: private investment lies at the heart of the productivity battle - We must catch up to guarantee our prosperity," April 21, 2008.

Columbia. At the North American level, Québec invests little in machinery and equipment in relation to the size of its economy. Québec has consistently trailed in private investment for the last 15 years or so, and its investment rate for machinery and equipment is substantially lower than that for Canada, Ontario and the U.S. That said, it bears mentioning that the latter's performance stems from massive investments in information and communication technologies.

Québec's sub-par performance dates to the early 2000s (graph 19), which is when the productivity gap vis-à-vis its largest trading partners began to grow (graph 20). In the early 1990s, when private investment in machinery and equipment was greater in Québec than in Canada as a whole, the province's productivity was the same. The link between new equipment purchases to modernize facilities and productivity could not be clearer. We must therefore promptly rectify this situation. Québec is therefore suffering from underinvestment by the private sector in business modernization, and given that it is

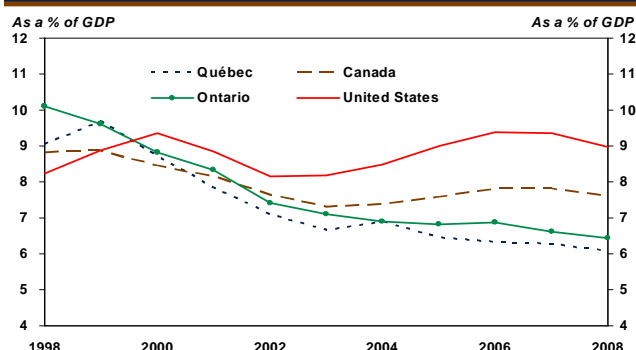
lagging behind its top trading partners in productivity, this trend must be quickly reversed. It must put the pedal to the floor to speed up productive business investment. First, the province must make up the lost ground and then move up in the ranking in order to enhance its competitiveness not just in North America but around the world. Because globalization is the order of the day, Québec must take steps to become more competitive both at home and abroad. Investments in the manufacturing sector have plummeted in recent years. The loonie's flight and tougher competition from overseas have sapped profits, prompting a wave of layoffs, cutbacks in spending, and sadly, plant closures. However, the response to this tough situation should have been for companies to modernize their facilities in order to better confront the merciless competition from emerging nations.

**TAXATION CONTINUES TO DISCOURAGE INVESTMENT**

The tax on capital, which is especially hard to handle in tough times, has certainly discouraged manufacturers from investing. One of the drawbacks of this type of tax is that it also applies to the company's loans, regardless of whether it is making a profit, adding to the tax burden during this downturn. The Québec government's decision to abolish this tax on productive investment in its 2008-2009 Budget is commendable as manufacturers will have more money to invest while those that are struggling financially will no longer be penalized.

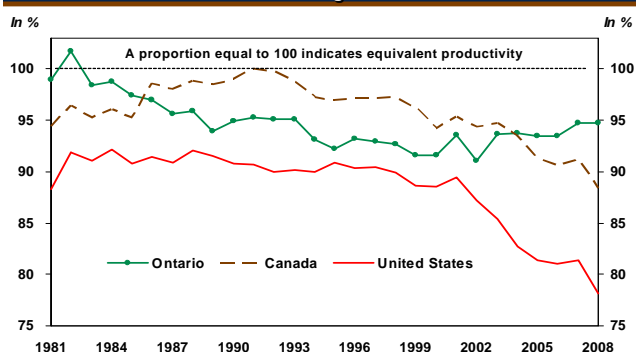
By the end of 2010, the tax on capital will be gradually eliminated for all companies. Since the other provinces and most of the U.S. states have already gone this route, Québec will continue to be penalized until next year. Besides the manufacturing industry, business taxation continues to discourage investment at a time when it should be doing the exact opposite. As the other provinces have already realized, we can no longer wait to act. Our tax system needs a complete overhaul, one that should include raising the price of public services and re-evaluating the State's role. The gradual elimination of the tax on capital will cost the government a hefty \$2 billions or so in revenues for 2011-2012. The government should consider decreasing or even abolishing other fixed expenses such as the payroll tax, which discourages job creation, even if it means raising corporate income tax. Doing so would give businesses a break during economic downturns while in boom times, they would contribute more to government coffers. The advantage of stable fixed expenses is that it provides the Québec government with a predictable tax revenue stream and a cushion in terms of public finances. Productivity, which is driven by stronger business investment, must become a priority in order to soften the impact of the demographic shock on economic growth.

**Graph 19 – Machinery and equipment investment is weak in Québec**



Sources: Statistics Canada, Datastream and Desjardins, Economic Studies

**Graph 20 – The productivity gap is widening between Québec and its neighbours**



Sources: Statistics Canada and Desjardins, Economic Studies

### REGULATIONS: AN OBSTACLE TO PRODUCTIVITY

While public policy helps, among other things, to ensure proper market operation and to safeguard the public, there is the question of the optimal level that should be imposed on business. Regulations cause distortions in the economic system because they cost both time and money that cannot be channelled to improving productivity. There are numerous indirect costs, for instance, delayed product introduction and discouraging innovation. Regulations vary from one province to another depending on the industrial concentration, with some sectors requiring more control. In 2005, the Canadian Federation of Independent Business (CFIB) calculated that regulations from the three levels of government cost Québec businesses \$8.1 billion or 3% of the province's GDP, relegating Québec to last place among the provinces. The provincial average was 2.6% while in Ontario, the cost accounted for 2.5% of its GDP.

Between 2001 and 2004, the Québec government cut the cost of administrative formalities by 20% for businesses and promised to trim another 20% by the end of 2010. While an optimal level is difficult to achieve, the government must commit to reducing this burden in order to remain competitive, and by extension, lift productivity. Although the level of regulation is not a key element of productivity, it does help establish a climate conducive to its growth. And although easing regulation is one way to boost productivity, it may be necessary in some cases to encourage research, for example, patent issuing in the pharmaceutical industry.

### INNOVATION: BUSINESS PLAYS A DECISIVE ROLE

Although the report on the elements associated with productivity is presented at the macroeconomic level, i.e. for the economy as a whole, a more detailed analysis is necessary to help businesses find concrete ways of enhancing their productivity. Each one's strategy may be different depending on their sphere of activity.

The report of the Canadian Council of the Academies offers clear solutions to this end. Companies must first draw up an action plan in order to gather the resources that will allow them to become more innovative. These resources could take the form of a team of highly qualified employees, an investment in staff training or in machinery and equipment, new or greater R&D efforts, outside consultants or suppliers. It can even include acquiring rights or partnering with other companies or public research centres and universities.

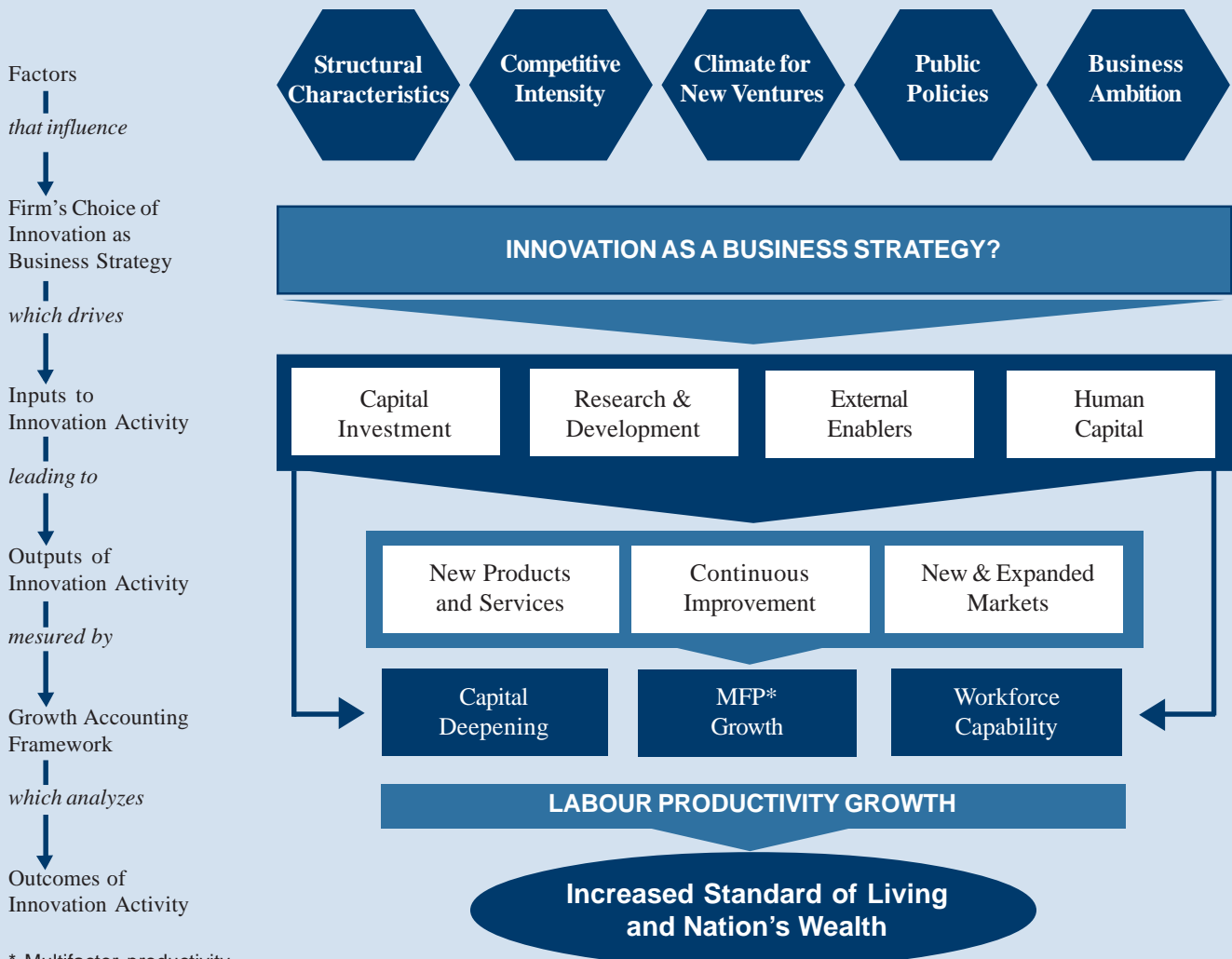
According to the innovation expert panel, corporate ambition is the key. For start-ups, access to financing, highly qualified graduates and potential partners are important aspects. For established companies, choosing an innovation strategy will depend on the activity sector and its location. The intensity of domestic and international competition will have the greatest impact on the level of innovation although public policies (regulation, taxation, assistance programs, etc.) can also play a role. Management's attitude towards innovation aimed at improving its offering by enhancing one or more steps in the production process is critical.

Diagram 2 on page 14 gives us a clearer picture of all the possible relationships and factors that affect innovation and the impact on the components of productivity, which ultimately, translates into an increase in living standard and collective wealth. The challenge of productivity is therefore quite formidable as it concerns all the milieus. Improving productivity depends on concrete actions adapted to each company's reality, while the governments' role is to create conditions that foster innovation.

### FAILURE TO LIFT PRODUCTIVITY GROWTH WILL LEAD TO TOUGH SOCIAL CHOICES

Productivity gains are considered a means of improving living standards since they benefit all the economic agents. Business profits increase, which usually translates into better wages for employees. This in turn leads to higher government revenues, providing the funds needed to maintain quality public services. The fact is that productivity gains are at the root of economic growth and greater prosperity for citizens. Given the unfavourable demographic outlook, which will soon manifest as a decline in the workforce, real GDP growth will depend entirely on productivity gains. If we do nothing to step it up, the Québec economy will fall into quasi-stagnation, leading to a breakdown in the wealth creation mechanism, and by extension, a decrease in living standard. The Fortin Report, which rates the living standard in the 50 U.S. states and the 10 Canadian provinces, placed Québec near the bottom of the list. Only two states and three of the Atlantic Provinces fared worse. Québec cannot afford to have its relative living standard deteriorate any further.

**Diagram 2**  
**Logic map of the Business Innovation process**



\* Multifactor productivity

Sources: Canadian council of Academies and Desjardins, Economic Studies

Weaker economic growth, combined with the projected increase in the cost of public services, which will be borne by a smaller number of working taxpayers, will have serious repercussions for Québec. In just a few years, the public purse, already tight before the recession, will come up against the quickly-aging population and the anticipated deficits. If productivity picks up sufficiently and allows the economy to keep on chugging at a respectable pace, we will be able to maintain some of our social programs, while others will at any rate have to be trimmed. Either way, society will have to make choices that are bound to spark a lively debate, particularly between the generations whose concerns are often

diametrically opposed, especially on the topics of health and education. Productivity is everybody's business. If it does not improve, Québec will be forced to make enormous sacrifices to keep its public finances in check. Debt is manageable so long as the creditors have confidence in the economy's ability to meet its payment obligations. For example, in the early 1980s, New Zealand was called to order and had to slash social programs in order to restore its financial health. Even Canada and Québec had to sharply curtail public spending in the 1990s in response to pressure by credit rating agencies. Better to address the problem now than to wait until our back is up against the wall.

**Table 2**  
**Which areas should Québec work on to boost productivity?**

Areas				
Business Innovation	R&D Spending	Machinery and Equipment Investment	Education	Regulation
Observations				
Canada and Québec are way behind at the international level	Québec is faring quite well internationally	Québec lags behind both at the global and North-American levels	Québec still has ways to go regarding education	Québec ranks last among Canadian provinces as regards the relative cost of regulation
How to do better				
Business strategy must be innovation driven	Maintain the attractive tax system (tax credits)	Review our tax system in order to encourage more investment (quickly eliminate the tax on capital)	Quickly resolve the dropout problem	Ease the administrative burden on business
Improve business management in order to be more efficient at every step of the overall process	Investments in R&D must bear fruit (better application of discoveries in industry)	Show and promote the need for long-term machinery and equipment investments	Make education a top priority again by increasing funding through greater funding at all levels, particularly of universities	Maintain adequate regulation to encourage research
Involve employees more to improve ways of doing things and create an environment conducive to the emergence of new ideas	Intensify partnerships between business and universities and research laboratories			Set up the conditions needed to make the labour market more flexible
Develop an action plan to leverage resources and knowledge apt to spur innovation (highly qualified employees, investments in equipment or R&D, key partnerships, etc.)				
Develop new niches in order to stand apart on the world stage				

Source: Desjardins, Economic Studies

Of the many challenges that will confront the Québec economy in the years ahead, remaining competitive in the global marketplace can't be ignored. Québec is at a crossroads on several fronts: obsolete public infrastructures, an aging population, and a hefty deficit, not to mention a high dropout rate<sup>21</sup> and poverty.<sup>22</sup> Since it's a foregone conclusion that we will lose the battle as far as demographic aging goes, it is essential that we boost our productivity in order to prevent economic growth from nosediving in the not too distant future and taking our standard of living with it. However, large innovative projects that are likely to attract top notch foreign

<sup>21</sup> MÉNARD, JACQUES, Report of the Groupe d'action sur la persévérance et la réussite scolaire au Québec, "Savoir pour pouvoir : Entreprendre un chantier national pour la persévérance scolaire," March 17, 2009.

<sup>22</sup> NOREAU, JOËLLE, "Despite the economic boom of the 2000s, poverty has not disappeared," Perspectives, economic analysis newsletter, Desjardins Group, Summer 2009.

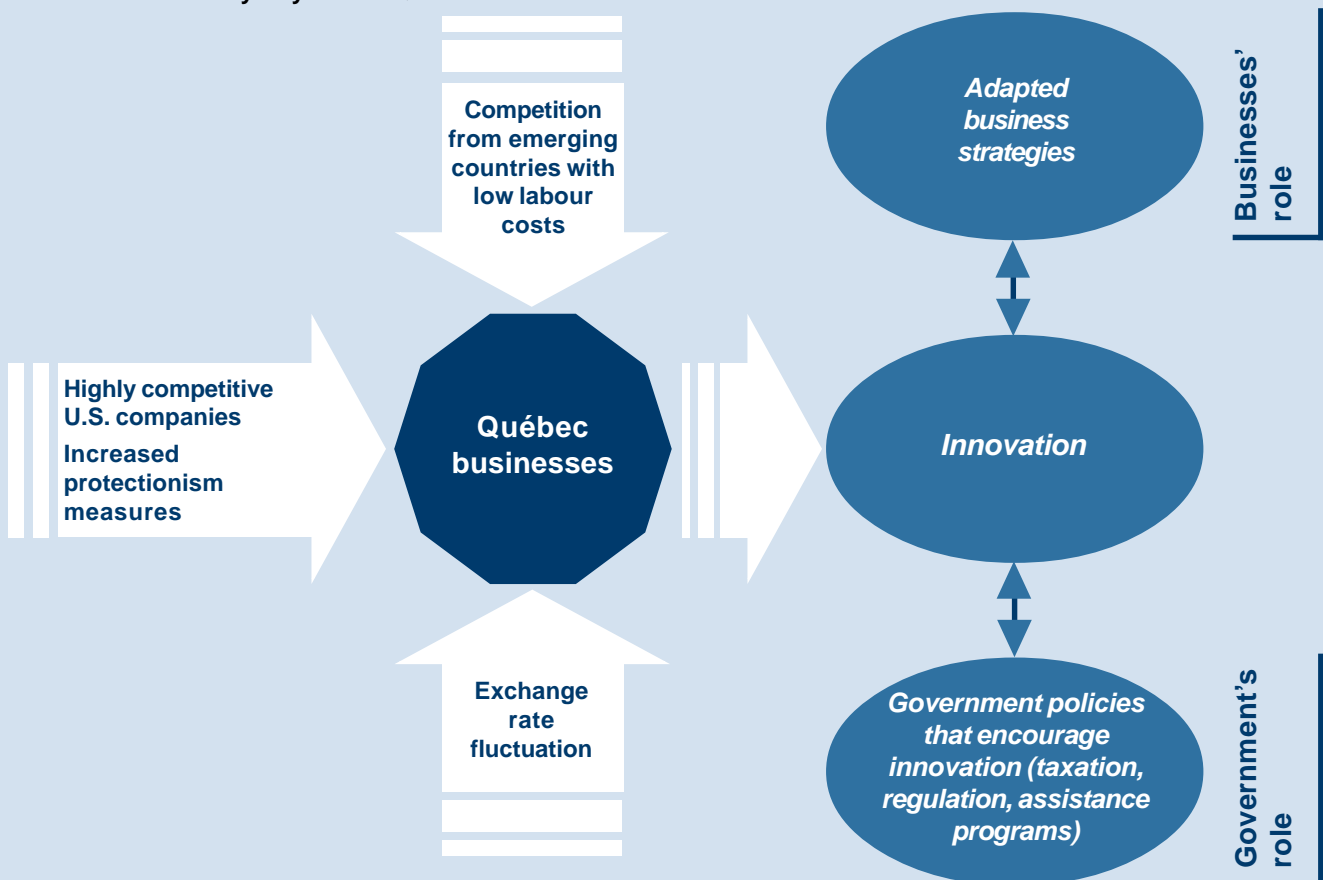
workers could ease the looming labour shortage<sup>23</sup>. To ensure its future prosperity and to continue delivering quality public services, Québec must prioritize innovation and education. Only in this way can it successfully take up the productivity challenge and continue offering its many social benefits.

Productivity depends on several factors (table 2). The governments, for their part, must establish an environment conducive to innovation by easing regulations as well as the tax burden on business. Although the tax on capital will be abolished by the end of 2010, until then, it will continue to heavily penalize investment in Québec, unlike the other provinces and most of the U.S. states, which have already abolished this tax. The link between equipment purchases

<sup>23</sup> See *Economic Viewpoint* "Québec economy: The adverse effects of demographic shock are looming - It is important to act now to soften the impact on the labour market," August 13, 2008.

**Diagram 3**

**Innovation is the only way out for Québec business**



Sources: Thales Canada Inc. and Desjardins, Economic Studies

aimed at modernizing facilities and productivity has been clearly established: it is therefore important to quickly remedy the situation in this regard.

The provincial government should continue with its tax credits, which encourage R&D spending, since our ranking in this regard is excellent on the world stage. However, this measure alone will not be enough to lift productivity to the required level. The investments in research must yield tangible results if business efficiency is to be improved. To this end, greater collaboration is needed between business and universities and public industrial research organizations.

Beyond the innovation-conducive environment the governments can create, businesses must accord innovation a bigger place in their growth strategies (diagram 3). Given the strength of the Canadian dollar and greater inroads made by emerging countries into the domestic market, companies operating in industries that are highly vulnerable to interna-

tional competition will not survive unless they become much more productive. Businesses must step up their innovation efforts by developing new niches in order to stand out on the world stage. Since innovation is the key driver of productivity, it must be at the heart of both public policies and business strategies. And to this end, employees must make a greater contribution. As well, we must focus on the workforce by improving the education system and through professional development, which also calls for the involvement of business. The key to prosperity for the Québec economy is to crank up its innovation efforts while focusing more on education.

**François Dupuis**  
Vice-President and Chief Economist

**Hélène Bégin**  
Senior Economist

**Hendrix Vachon**  
Economist