PROSPERA

The Quebec Economic Barometer

Driven by

BCF BUSINESS LAW

quadrat

Prepared by

FD consultation

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This report was prepared by François Delorme and Silas Xuereb from François Delorme Consulting inc. We would like to express our gratitude to Jean-Pierre Aubry, David Dupuis, Pierre Fortin, and Alain Robichaud for their invaluable comments. The authors naturally assume responsibility for any errors or omissions that might remain in this document.

A word from Julie Doré

Partner, lawyer, member of the Executive Committee, BCF

With more than 500 employees, including 300 professionals, BCF Business Law is the go-to firm for business leaders, entrepreneurs, and growing companies that have chosen Quebec and Canada as a stepping stone for their growth and success. Our entrepreneurial spirit and dedication to Quebec's economic growth distinguish us from other law firms.

Given this commitment, BCF has partnered with Prospera—the Quebec Economic Barometer to add a powerful indicator that will measure and analyze Quebec's long-term economic performance, and compare it to Ontario's and Canada's.

This detailed document presents the structural aspects of our economy, highlighting significant and promising trends that have shaped our prosperity over the past decades.

Our involvement with businesses in Quebec and around the world is at the heart of our mission. We aim to foster their growth and success. Our participation in the creation of Prospera is further evidence of our commitment to support and promote Quebec's economic dynamism.

Enjoy the read

A word from Alain Robichaud

Founding President of Quadrat Conseils

More than ever, the topic of Quebec's economy has become top of mind, the government having committed to reducing the historical gap that separates us from Ontario. The Quebec Economic Barometer allows us to envision future trends with optimism.

I launched this initiative with the objective of providing a long-term perspective on our economy in order to enable a fairer and more accurate analysis of our economy's vitality. This Barometer is based on robust methodology, developed by François Delorme, which has been recognized by numerous reputable economic institutions in Canada, as well as validated by a committee of renowned economic experts. I'd like to thank them for their invaluable contributions.

This document allows us to deepen our understanding of the forces that shape our prosperity, and of the key factors that have contributed to Quebec's economic success. It therefore allows us to make sense of the significant challenges that await us in the upcoming years. On that topic, the energy transition appears to be a major issue where Quebec already has an undeniable advantage thanks to its hydroelectric production. We must accelerate this transition to preserve this advantage and become a key player in the field.

I wish you an enriching read for a better understanding of Quebec's economy.

Introduction

The Barometer aims to emphasize the **structural** aspects of the economy, rather than its cyclical changes.

This report presents the development of an index (the Quebec Economic Barometer) that aims to summarize the evolution of the health of the Canadian, Quebec, and Ontario economies over the past 40 years, and to identify significant and promising trends. Contrary to many other indexes designed to predict short-term changes in the economic cycle, this index aims expressly to provide a picture of our economic performance's long-term sustainability.

It's particularly interesting to contrast the Barometer with the Government of Quebec's objective of narrowing the gap between Quebec and Ontario's real GDP per capita. As a reminder, the gap currently sits at 13 percent in 2023, with the government aiming to reduce it to 10 percent by 2026[1]

First and foremost, the Barometer is not intended for the real-time observation of economic conditions, or for closely tracking economic cycles. On the contrary, it is designed to help us understand how different economies will fare over the next five to ten years. It therefore aims to emphasize the **structural** aspects of the economy, rather than its cyclical changes.

Secondly, the current index is complementary to what the Government of Quebec aims to achieve. Indeed, in the current exercise, real GDP per capita contributes 20 to 30 percent of the growth of Quebec's economic prosperity index, depending on the sub-periods. This implies that the government's objective of reducing the income gap per capita would accelerate the improvement of Quebec's prosperity compared to Ontario.

Our index is composed of 28 variables that have an impact on economic performance. Among these variables, we include economic growth, investment, human capital, and the environment. Furthermore, due to the worsening environmental crisis, it seemed essential that we include variables related to environmental sustainability in order to address the climate crisis and thus achieve green, sustainable growth.

Moreover, while previous measures of economic performance generally ignore the household experience, we elected to include variables related to household finances to our index. In fact, there is growing evidence of a positive relationship between sustainable economic prosperity and the equitable distribution of growth within a society.

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[1] 2023-2024 Quebec Budget, pages A.3 and A.4.

The index is arbitrarily set to 100 in 1980, meaning that changes in the index reflect relative changes in variables between jurisdictions, rather than absolute changes.

The Barometer's mission is for its resulting outcomes to shed light on debates about the effectiveness of public policies in Quebec and Canada.

After a brief overview of Quebec's economy over the past 40 years, this report presents the Barometer's results. It provides an understanding of:

01. How the index has evolved over time

02. How the three jurisdictions compare

03. How the different variables contribute to the Barometer's composition

Subsequently, we move on to a brief discussion and interpretation of the results. Finally, we provide a detailed presentation of the methodology used to construct the index.

Quebec Over the Past 40 Years: A Bird's-Eye View

This concise history draws heavily from Pierre Fortin, "L'économie du Québec : brève histoire et perspective [The economy of Quebec: a brief history and perspective]" 12 Jun. 2023, Speech, and Paquin, S. and H. Rioux, La Révolution tranquille 60 ans après [Sixty years after the Quiet Revolution] (Les Presses de l'Université de Montréal, 2022).

Quebec Over the Past 40 Years: A Bird's-Eye View

Since the 1960s, Quebec has experienced remarkable economic progress. Not only has the standard of living of its population increased steadily, it surpassed Ontario's in the late 1960s.

The progression of Quebec's standard of living was slow and uneven until the end of the 1980s. While a significant part of this result can be attributed to large-scale hydroelectric projects, their impact was temporary. Starting in the 1990s, however, Quebec's catch-up has been rapid and enduring. According to Fortin (2023), this development is due to five main factors:

The strong performance of Quebec's economy since 1980 is not coincidental, but the result of well-anchored structural trends at its core.

01. The education reform of the 1960s at its culmination 20 years later, alongside a particularly dynamic generation of entrepreneurs.

02. The establishment of lasting social peace after the intense social conflicts of the 1970s and early 1980s.

03. The internationalization of the economy, with a new generation of educated entrepreneurs, the opening of World Trade Organization rules, and the Canada-U.S. Free Trade Agreement.

04. Bold family policies on parental leave and childcare services that elevated Quebec's female labour force to a global peak.

05. A significant reduction in the burden of provincial debt starting in 1996, mainly due to the global decline of interest rates, but also due to budgetary consolidation efforts by the Quebec government.

In short, the strong performance of Quebec's economy since 1980 is not coincidental, but the result of well-anchored structural trends at its core. These developments are highlighted by the Barometer's results, which we will analyze in the following section.

Overall Results

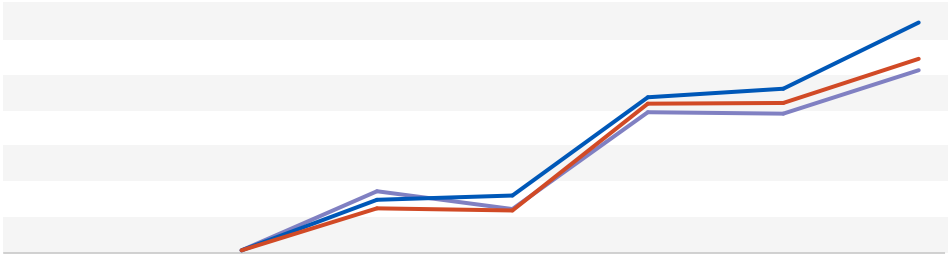
Overall Results

The Barometer's results show that in 2021, Quebec is leading with an index of 132.0, followed by Canada at 126.9 and Ontario at 125.3.

These results suggest that Quebec's economy as captured by the Barometer has improved by 32% since 1980, whereas Canada as a whole improved by only 26.9% and Ontario, by 25.3%. Figure 1 shows the evolution of the index in Quebec, Canada and Ontario for the period from 1980 to 2021.

The index's results show that in 2021, Quebec is leading with an index of 132, followed by Canada at 126.9 and Ontario at 125.3.

Figure 1:
Economic Barometer from 1980 to 2021 for Canada, Quebec and Ontario



	1980	1989	1993	2007	2009	2021
Canada	100	105.9	105.6	120.6	120.7	126.9
Quebec	100	107.1	107.7	121.5	122.7	132
Ontario	100	108.3	105.8	119.4	119.2	125.3

During the 1980s, Ontario led with a strong economic performance, but experienced a significant decline during the 1989–1993 recession.

In the following years, from 1994 to 2007, all three jurisdictions showed good results. Overall, Canada slightly surpassed Ontario during this period.

Subsequently, the 2008–2009 recession was challenging for all three jurisdictions. Nevertheless, the impact of the recession varied, with Quebec maintaining good results while Ontario experienced another drop during and after the recession.

In conclusion, since 2010, all three jurisdictions performed well, but Quebec continues to lead. What's more, it's worth noting that the COVID-19 crisis had surprisingly little notable impact on the index.

Indeed, stagnation of exports and economic growth was offset by increased energy efficiency, the use of renewable energy, and the relative improvement of household finances.

The Key Blocks that Contributed to the Better Relative Performance of Quebec's Economy

Which Economic Sectors Explain Quebec's Good Performance?

How have the major trends (or blocks) enabled Quebec to achieve better economic results than Ontario and Canada? What are the specific variables that have primarily contributed to Quebec's economic expansion? The next two subsections will adress this.

Table 1 helps provide answers to the first of these two important questions. In the table, variables are grouped into six major blocks, and each block's respective contribution to the Barometer is presented for each jurisdiction. For a complete list of the variables included in each group, refer to Table A.1 in the appendix.

Six categories of variables in the prosperity index

Human Capital
Growth
Investment
Business
Environment
Households

Table 1:
Respective Contribution of Each Block to the Economic Barometer, Canada, Quebec and Ontario, 1980 to 2021

	Human Capital	Growth	Investment	Business	Environment	Households
Canada	5.95	3.75	12.10	0.37	6.16	-1.39
	22.1%	13.9%	44.9%	1.4%	22.9%	-5.1%
Quebec	5.20	7.13	12.85	0.93	6.83	-0.96
	16.3%	22.3%	40.2%	2.9%	21.4%	-3.0%
Ontario	4.17	5.77	9.42	1.18	7.30	-2.54
	16.5%	22.8%	37.2%	4.7%	28.9%	-10.0%

Note: Absolute contributions are presented on the first row, and relative contributions, on the second.

Quebec has outperformed Canada and Ontario in areas related to growth[2] and investment[3] for the past 40 years (lines 1, 3, and 5 in Table 1). As mentioned earlier, these are relative changes since 1980, not absolute changes. While this means that Quebec has indeed experienced higher growth of these variables since 1980, it does not necessarily demonstrate higher absolute levels.

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2 The variables that constitute the "Growth" block include exports, venture capital, domestic private foreign investment, domestic investment outside of Canada, imports, GDP per capita in the working-age population, indexes (Herfindahl-Hirschmann) that measure the concentration of net exports per industry and per good, respectively. See Table A.1 in the appendix.

3 The variables that constitute the "Investment" block include gross fixed capital formation, fixed capital stock per capita, public debt-to-GDP ratio, R&D expenditures, and ICT investment as a proportion of the GDP. See Table A.1 in the appendix.

Similarly, over the period from 1980 to 2021, Ontario shows a slightly more significant positive contribution to the categories “Business” and “Environment” in its Barometer, as compared to Canada and Quebec. However, Quebec’s recent positioning in renewable energy and per capita GHG-emission levels should allow it to outperform the other two jurisdictions in the coming years in the context of the ecological transition.

In terms of Households (last column of Table 1), Ontario’s performance is significantly hindered compared to the other jurisdictions, mainly due to increasing and concerning household debt. Specifically, our results suggest the favourable presumption of a link between the lesser degradation of the economic situation of households and Quebec’s good performance on the Barometer.

Perhaps more intuitively, lines 2, 4, and 6 of Table 1 indicate contribution as a percentage to the Barometer for the period from 1980 to 2021. In general, we observe that all the themes have positively contributed to the Barometer in each jurisdiction, with the exception of the Households category. This is indeed a concerning trend. While median income contributes positively to prosperity over the whole of the period for all jurisdictions, household debt can represent a significant hurdle in terms of the loss of financial flexibility, systematically offsetting the positive contribution from income gains.

Table 1 shows that **Investment** had the greatest impact on the index for each jurisdiction, representing 44.9% of economic prosperity in Canada, 40.2% in Quebec, and 37.2% in Ontario.

The Environment block generally ranks second in terms of its contribution, while **Growth** and **Human Capital** compete for third position across jurisdictions.

Variables related to **Business** (such as industry concentration, the number of active owners of incorporated businesses without employees, and capital intensity), on the other hand, contributed little to the growth of the index over the whole of the period.

The Households block weighed down the Barometer to varying degrees due to household debt, as highlighted earlier.

The next section delves deeper into the diagnosis for each of the six themes by examining the specific variables that contribute most significantly to the Barometer.

Which Specific Variables Affect the Barometer the Most

Which Specific Variables Affect the Barometer the Most

A variable's contribution to the index depends on both its growth over time and its weight[4].

Weights have an inverse relationship with variance, which is to say that variables that are most stable over time, and are thus presumed to be more reliable and more indicative of future performance, are assigned a heavier weight.

Table 2 below presents the Top 3 and Bottom 3 variables in terms of their contribution to the index's progression for the period from 1980 to 2021 for all three jurisdictions. Tables 3 and 4 present the same information, but over specific sub-periods. When it comes to isolating the factors that contribute to better Barometer performance, our results show that these variables strongly support economic prosperity.

The first observation is that there is relatively little movement at the extremes of the rankings over time. Very positive and very negative variables tend to remain as such. This indicates that the same factors seem to act consistently as accelerators or hurdles to the prosperity of Quebec and the other two jurisdictions.

A variable's contribution to the index depends on both its growth over time and its weight.

Table 2:
Contributions of the Most Significant and Weakest Variables to the Barometer for Each Jurisdiction, 1980–2021

Rank	Canada		Quebec		Ontario	
	1980–2021					
1	R&D Expenditures	18.1%	GDP / Pop 15-64	20.3%	GDP / Pop 15-64	19.5%
2	Post-Secondary Graduation Rate	18.0%	Post-Secondary Graduation Rate	14.9%	Post-Secondary Graduation Rate	16.0%
3	GDP / Pop 15-64	16.3%	Capital Stock / Pop	14.5%	R&D Expenditures	16.0%
14	Working-Age Population	-4.6%	Household Debt / Disposable Income	-4.6%	Net Debt / GDP	-5.8%
15	Household Debt / Disposable Income	-7.6%	Working-Age Population	-7.9%	Household Debt / Disposable Income	-12.2
16	Imports	-12.6%	Imports	-9.8%	Imports	-12.9

Note: The numbers are a percentage of the total increase / decrease in a given jurisdiction over each period.

[4] See the "Methodology" section for more details.

For the period from 1980 to 2021, with regard to Quebec, we first note the strong contribution of per capita growth (as measured by the ratio of GDP to population aged 15 to 64), which ranks at the top of the trio of the most positive factors (i.e., that influence the Barometer most strongly), followed by the graduation rate, and by per capita fixed capital stock.

It is also worth noting that the graduation rate has been a significant factor of growth since the 1990s, but did not make the Top 3 in Quebec from 1980 to 1988. In fact, it's highly probable that the increase in human capital was also significant in the 1980s, but, unfortunately, the time-series data for the graduation rate is not available before 1990. As such, this variable is not included in the rankings from 1980 to 1988.

Sustained per capita growth and investments in physical and human capital **represent crucial and enduring motors for Quebec's economic prosperity.**

These findings suggest an important general result stating that, in addition to sustained per capita growth, investments in physical and human capital **represent crucial and enduring motors for Quebec's economic prosperity.**

Economic theory has taught us that infrastructure has always been the cornerstone of long-term growth.[5] On the other hand, education, with its numerous direct and peripheral impacts, has become a steadily growing artery that explains the economic health of today's ecosystems.[6]

Taken together, these variables explain half of the index's growth in Quebec over the last 40 years.

As for Ontario and Canada, we see that GDP per working-age population and the proportion of people with post-secondary education appear among the three principal factors contributing to the improvement of their respective indexes. However, unlike Quebec, the third principal factor for Ontario and Canada is research and development expenditure.

Furthermore, the indexes of all three jurisdictions are negatively affected by certain variables, such as imports, household debt-to-disposable income ratio, and the percentage of the population aged 15 to 64. The predominance of imports is a result of the open nature of Quebec's economy, as well as of increased international trade; it's not particularly concerning as long as exports also increase. Also of note are the negative impact of private debt and the aging population.[7]

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5 See R. J. Barro, "Government Spending in a Simple Model of Endogenous Growth", Journal of Political Economy, 98(5) (1990), 103–126.

6 See R. E. Lucas, "On the Mechanics of Economic Development", Journal of Monetary Economics, 22 (1988), 3–42.

7 For a complete list of the relative contributions to the index of each variable in each jurisdiction, refer to Table A.2 in the appendix.

For further analysis, we examined the contributions of individual variables over five sub-periods: 1980–88, 1989–93, 1994–2007, 2008–09 and 2010–2021. These periods were selected to separate recessions from periods of growth. Tables 3 and 4 present the three variables with the most significant positive contributions per jurisdiction per period on the first three lines. They also present the three most significant negative contributions on the last three lines.

It can be concluded that all three jurisdictions were stimulated by strong investments from 1980 to 1988, both in research and development and in fixed capital. Economic growth over the 1980s also made it possible to maintain good performance.

However, a parallel decrease of median real income after tax can be observed in all three jurisdictions. Nevertheless, Ontario experienced a smaller decline during this sub-period, allowing it to outperform Quebec and Canada as a whole.

After reaching an index value of 108.3 in 1989, Ontario suffered more from the recession compared to Quebec and the rest of Canada. This finding can largely be explained by falling employment rates and median household income, and increasing household debt and public debt in Ontario.

In addition to its more diversified economic structure, Quebec managed to avoid a decline during this period thanks to these long-term prospects. Indeed, Quebec chose to focus on significant increases in post-secondary education and fixed capital investment.

Table 3:
Contributions of the Most Significant and Weakest Variables to the Barometer for Each Jurisdiction, 1980–88, 1989–93, and 1994–2007

Rank	Canada		Quebec		Ontario	
1980–1988						
1	R&D Expenditures	30.8%	GDP / Pop 15–64	29.1%	R&D Expenditures	23.0%
2	GDP / Pop 15–64	22.1%	R&D Expenditures	26.1%	GDP / Pop 15–64	22.2%
3	Fixed Capital Stock per capita	13.0%	Gross Fixed Capital Formation	16.6%	Gross Fixed Capital Formation	14.5%
14	Long-Term Unemployment Rate	-3.8%	Long-Term Unemployment Rate	-3.5%	Private Foreign Investment in Canada	-0.2%
15	Median After-Tax Income	-4.5%	Median After-Tax Income	-5.2%	Median After-Tax Income	-0.7%
16	Imports	-13.2%	Imports	-10.9%	Imports	-11.1%
1989–1993						
1	Post-Secondary Graduation Rate	285.5%	Post-Secondary Graduation Rate	53.9%	Post-Secondary Graduation Rate	19.5%
2	R&D Expenditures	254.2%	Fixed Capital Stock per capita	51.3%	R&D Expenditures	18.7%
3	Overall Labour Force Participation 45–64	148.7%	R&D Expenditures	48.7%	Exports	16.1%
20	Household Debt-to-Disposable Income Ratio	-149.9%	Working-Age Population	-23.2%	Working-Age Population	-28.0%
21	Long-Term Unemployment Rate	-149.9%	Net Debt / GDP	-24.1%	Long-Term Unemployment Rate	-29.3%
22	Median After-Tax Income	-169.4%	Median After-Tax Income	-27.3%	Net Debt / GDP	-42.1%
1994–2007						
1	Post-Secondary Graduation Rate	17.6%	Post-Secondary Graduation Rate	18.4%	Post-Secondary Graduation Rate	18.5%
2	R&D Expenditures	11.8%	GDP / Pop 15–64	15.3%	Energy Efficiency (GDP divided by energy consumption)	13.0%
3	GDP / Pop 15–64	11.2%	Fixed Capital Stock per capita	11.4%	GDP / Pop 15–64	12.0%
25	HHI — Net Exported Goods	-2.2%	Entrepreneurs / Labour	-2.7%	Entrepreneurs / Labour	-1.4%
26	Household Debt-to-Disposable Income Ratio	-7.5%	Household Debt-to-Disposable Income Ratio	-7.6%	Household Debt-to-Disposable Income Ratio	-9.5%
27	Imports	-10.2%	Imports	-9.9%	Imports	-9.8%

Note: The numbers are a percentage of the total increase / decrease in a given jurisdiction over each period.

From 1994 to 2007, all three jurisdictions experienced sustained improvements in their economic prosperity, due in particular to increased post-secondary education and GDP growth per working-age population. Fixed-capital investments, exports, and energy efficiency also increased over this period, while household debt continued to rise.

During the 2008–2009 recession, Ontario once again suffered more than Canada and Quebec. Rising long-term unemployment, falling employment rates, and the decreasing diversity of net exports all contributed to Ontario's more intense decline compared to the other jurisdictions. Improved environmental performance contributed to the increase of Quebec's index in 2008–2009.

Starting in 2010, sustained improvement is noted in all three jurisdictions, with similar increases in Ontario and Canada, and a slightly more significant increase in Quebec.

This overall improvement can be attributed to sustained economic growth, increased energy efficiency, improved potential for renewable energies, and better post-secondary success rates. On the other hand, a drop in the proportion of the working-age population drove down the indexes.

Table 4:
Contributions of the Most Significant and Weakest Variables to the Barometer for Each Jurisdiction, 2008–09 and 2010–21

Rank	Canada		Quebec		Ontario	
2008–2009						
1	GHG Emissions per capita	321%	Fixed Capital Stock per capita	32.4%	GHG Emissions per capita	280%
2	GDP from Natural Resource Extraction / GDP	219%	HHI – Net Exported Goods	30.8%	HHI — Industry Concentration	193%
3	Fixed Capital Stock per capita	211%	Energy Efficiency (GDP divided by energy consumption)	28.8%	Capital Intensity	164%
26	Private Foreign Investment in Canada	-223%	Private Foreign Investment in Canada	-25.7%	Exports	-174%
27	Household Debt-to-Disposable Income Ratio	-304%	Household Debt-to-Disposable Income Ratio	-30.0%	Household Debt-to-Disposable Income Ratio	-214%
28	Private Foreign Investment	-623%	Private Foreign Investment	-72.0%	Private Foreign Investment	-419%
2010–2021						
1	Electric Capacity from Renewable Sources	28.9%	GDP / Pop 15-64	21.7%	Energy Efficiency (GDP divided by energy consumption)	29.1%
2	Post-Secondary Graduation Rate	25.1%	Energy Efficiency (GDP divided by energy consumption)	21.4%	Electric Capacity from Renewable Sources	24.5%
3	Energy Efficiency (GDP divided by energy consumption)	21.6%	Post-Secondary Graduation Rate	15.4%	GDP / Pop 15-64	22.2%
26	Net Debt / GDP	-11.0%	Entrepreneurs / Labour	-6.4%	Imports	-15.1%
27	Imports	-14.6%	Imports	-8.3%	Household Debt-to-Disposable Income Ratio	-18.2%
28	Working-Age Population	-32.1%	Working-Age Population	-29.0%	Working-Age Population	-25.5%

Note: The numbers are a percentage of the total increase / decrease in a given jurisdiction over each period.

Key Takeaways

Key Takeaways

At the heart of this exercise, we wanted to answer two simple questions:

01. "What are the underlying trends that contributed to the improvement of Quebec's economic prosperity?"

02. "Is Quebec on the right track for future, sustainable prosperity?"

The Quebec Economic Barometer incorporates 28 structural variables that represent "strong trends" and spans over the last 40 years (from 1980 to 2021) in order to provide a comprehensive perspective.

The main findings that can be drawn from this analysis are as follows:

01. Quebec has undeniably improved its economic prosperity since 1980 and outperformed Ontario and Canada.

02. The variables that had the greatest positive impact on the Quebec Economic Barometer over the past 40 years are, in order:

1) GDP-to-working-age population ratio

2) Post-secondary graduation rate for the population as a whole

3) fixed capital stock per capita

These three variables account for nearly half of the Barometer's increase for the period 1980-2021

03. The various "drivers" the contributed to the strong performance of Quebec's economy change slightly based on the sub-period

One of the fundamental findings of this exercise is that the growth of GDP per working-age population played a crucial role in Quebec's economic prosperity.

As Fortin (2018) aptly points out, this is mainly attributable to the rapid rise in employment rates over the past 20 years.[8] As he further emphasizes, *"Quebec's work-family balance measures (especially low-cost daycares and extended parental leave) strongly encouraged young Quebec women's participation in the labour market. Their activity ratio is now among the highest in the world."* It should also be noted that Quebec's economy suffered less at the hand of the 2009 recession than most other advanced economies, in large part due to the infrastructure plan put in place by the Government of Quebec in 2007.

These empirical findings suggest, without a shadow of a doubt, that the underlying trends of the Quebec economy are healthy and that Quebec's economic prosperity is improving.

This analysis also identifies variables to capitalize on in the future in order to stay on this path.

The underlying trends of the Quebec economy are healthy and Quebec's economic prosperity is improving.

- The analysis reveals that vigorous growth is key to improving Quebec's economic prosperity. It's therefore a matter of stimulating the employment rate by promoting activity among the 55- to 74-year-olds who wish to work.
- It also shows how an educated population contributes to strengthening the structural foundations of the Quebec economy. It is then essential that we keep fighting against dropping out of school, and encourage staying in school until college, university, or trade school graduation.
- It points out that we can expect the Environment block to become an increasingly important driver for Quebec, given the potential of its renewable energy production with respect to the ecological transition.
- It also identifies the key role of residential and non-residential investments. This is the vector through which we'll manage to stimulate the growth rate of productivity, Quebec's productivity having been half as effective as Ontario's and the United States' over the past 10 years.

The analysis thus allows us to take note of all the factors that have improved the health of Quebec's economic ecosystem. It is now a matter of adopting or consolidating public policies that will contribute to reinforcing these trends.

8 See Pierre Fortin, "50 ans de performance économique au Québec [50 Years of Economic Performance in Quebec]", L'Actualité, (April 6, 2018).

Overall, these results suggest that Canada, Quebec, and Ontario have improved their economic prosperity since 1980.

In addition, Quebec's economic prospects have improved more than Ontario's and Canada's. However, Quebec initially had lower levels of fixed capital and a lower GDP per working-age population, and its long-term unemployment rate was higher.

These results highlight the important role of human capital and investment as precursors to long-term productivity growth and economic performance.

Significant increases in post-secondary education and fixed capital formation put Canada on the right track. However, the aging population and growing household debt could hinder this growth in Canada, Quebec, and Ontario. Moreover, the fact that household finances have not improved in any of these jurisdictions over the past 40 years represents an enormous missed opportunity.

Furthermore, integrating environmental sustainability in the Economic Barometer has allowed us to recognize that any future economic performance is uncertain if Canada does not quickly transition to renewable energy and reduce its greenhouse gas emissions. As mentioned above, on that count, Quebec is well positioned.

Appendix 1: Methodology

Appendix 1: Methodology

In this appendix, we describe the methodology used to construct the economic prosperity index. Generally, we adhere to the methodology used by economic organizations such as the Conference Board of Canada to construct composite indexes. The construction of the index involves the following steps:

01. Selecting the variables included in the index.

Firstly, we started by selecting 28 variables that expert economics use for their predictive values of long-term economic growth.

We retained the variables that reflect environmental sustainability and household economic status. In fact, these factors also play a significant role in promoting long-term economic prosperity. The Barometer includes five environmental variables and two variables relating to households.

02. Collecting data for each of the variables for as many years as possible from 1980 to 2021 for each jurisdiction.

Data for most of the index's variables come from Statistics Canada's public tables, while other data were obtained from other government sources as well as international organizations. Most variables were available for each jurisdiction starting in 1980 or 1981 up to 2021.

In cases where certain variables were only available starting in subsequent years, we adjusted the index accordingly. As for the years were variables are available, there is no issue. However, for the years when data are missing, we consider that these variables have no effect on the index.

For certain variables, including the percentage of GDP from natural resource depletion and the household debt-to-disposable income ratio, data were available for a longer period for Canada than for Quebec and Ontario. In this case, we assume that the ratio of observations for Quebec and Ontario to Canada remains constant at the initial value for the years when Canadian values are observed.

03. Calculating the annual growth rate of each variable and the standard deviation of the growth rate for each jurisdiction.

To calculate the annual growth rate of each variable (X), we use the formula for symmetrized percent change (SPC):

$$SPC\ (X_{it}) = 200 \times \frac{X_{it} - X_{it-1}}{X_{it} + X_{it-1}}$$

Here, i indicates the jurisdiction and t, the year. The standard deviation (SD) for each variable is then calculated as:

$$SD\ (X_i) = \sqrt{\frac{\sum_t^T (X_{it} - \mu_i)^2}{T - 1}}$$

Where T is the number of years with data, and μ_i is the average of X¬i.

04. Assigning a heavier weight to variables with less annual variation.

Calculate the sum of the inverse of the standard deviation of each variable in the jurisdiction. The weight (W) of each variable is equal to its share of the sum of inverse standard deviations in its jurisdiction:

$$W\ (X_i) = \frac{\frac{1}{SD_i\ (X_i)}}{\sum_i^n \frac{1}{SD_i\ (X_i)}}$$

Where n is the number of variables.

05. Calculating the variable's contribution to the index for a given year by multiplying its weight by its annual growth rate.

The contribution (Ci) of each variable for each jurisdiction is calculated as follows each year:

$$C_{it}\,(X_{it}) = W\,(X_i) \times SPC\,(X_{it})$$

We take the sum of these contributions to find the total change expressed as a percentage (P) of the index for that year.

$$P_{it} = \sum_{j}^{n} C_{it}\,(X_{it\,j})$$

06. Calculating the index.

To calculate the index, we adapt the symmetrized percent change formula, where the annual percentage change is the sum of contributions calculated in step 5, with the index anchored at 100 in 1980:

$$EHI_{it} = EH_{it-1} \times \frac{200 + P_{it}}{200 - P_{it}}$$

Tables

Tables

Table A.1:
Variables Included in the Economic Barometer by Category

Categories	Human Capital	Growth	Investment	Business	Environment	Households
Variables	— Overall Labour Force Participation 45-64 — Working-Age Population — Employment Rate — Long-Term Unemployment Rate — Post-Secondary Graduation Rate	— Exports — Venture Capital — Private Foreign Investment in Canada — Foreign Investment Outside of Canada — Imports — GDP per Working-Age Population — HHI — Net Exported Goods — HHI — Net Exported Industry	— Gross Fixed Capital Formation — Fixed Capital Stock per capita — Public Debt / GDP — R&D Expenditures — ICT Investment as a % of GDP	— Industry Concentration — Entrepreneurs / Labour — Capital Intensity	— GHG Emissions per capita —GDP from Natural Resource Extraction / GDP — Proportion of Energy from Renewable Sources — Energy Efficiency — Electric Capacity from Renewable Sources	— Median After-Tax Income — Household Debt-to-Disposable Income Ratio

Table A.2:
Contribution to the Index of Each Variable by Jurisdiction, 1980–2021

Rank	Canada		Quebec		Ontario	
1	R&D Expenditures	18.1%	GDP / Pop 15–64	20.3%	GDP / Pop 15–64	19.5%
2	Post-Secondary Graduation Rate	18.0%	Post-Secondary Graduation Rate	14.9%	R&D Expenditures	16.0%
3	GDP / Pop 15–64	16.3%	Fixed Capital Stock per capita	14.5%	Post-Secondary Graduation Rate	16.0%
4	Fixed Capital Stock per capita	13.0%	R&D Expenditures	13.8%	Energy Efficiency (GDP divided by energy consumption)	14.4%
5	Gross Fixed Capital Formation	11.7%	Gross Fixed Capital Formation	11.4%	Gross Fixed Capital Formation	13.5%
6	Energy Efficiency (GDP divided by energy consumption)	10.9%	Energy Efficiency (GDP divided by energy consumption)	11.1%	Exports	12.6%
7	Exports	10.5%	Exports	10.0%	Fixed Capital Stock per capita	10.1%
8	LFP for ages 45–64	9.3%	LFP for ages 45–64	7.5%	Electric Capacity from Renewable Sources	6.6%
9	Electric Capacity from Renewable Sources	7.6%	Electric Capacity from Renewable Sources	5.1%	LFP for ages 45–64	5.9%
10	ICT Investment as a % of GDP	2.7%	GHG Emissions per capita	3.1%	GHG Emissions per capita	5.3%
11	Median After-Tax Income	2.5%	ICT Investment as a % of GDP	2.8%	ICT Investment as a % of GDP	3.4%
12	Venture Capital	2.5%	HHI — Industry Concentration	2.6%	Entrepreneurs / Labour	2.6%
13	GHG Emissions per capita	2.5%	Venture Capital	2.0%	Venture Capital	2.5%
14	GDP from Natural Resource Extraction / GDP	2.1%	Median After-Tax Income	1.6%	Median After-Tax Income	2.2%
15	Entrepreneurs / Labour	1.1%	Employment Rate	1.4%	GDP from Natural Resource Extraction / GDP	2.1%
16	Private Foreign Investment in Canada	1.0%	GDP from Natural Resource Extraction / GDP	1.4%	HHI — Industry Concentration	1.9%
17	HHI — Industry Concentration	0.7%	Private Foreign Investment in Canada	0.9%	HHI — Net Exported Goods	1.4%

18	Employment Rate	0.3%	Proportion of Primary Energy Demand from Renewable Energy	0.7%	Private Foreign Investment in Canada	1.1%
19	Proportion of Primary Energy Demand from Renewable Energy	-0.2%	HHI — Net Exporting Industries	0.6%	Proportion of Primary Energy Demand from Renewable Energy	0.5%
20	Capital Intensity	-0.4%	Long-Term Unemployment Rate	0.4%	Capital Intensity	0.2%
21	Net Debt / GDP	-0.5%	Capital Intensity	0.2%	HHI — Net Exporting Industries	0.2%
22	Long-Term Unemployment Rate	-0.9%	Entrepreneurs / Labour	0.2%	Employment Rate	-0.7%
23	HHI — Net Exporting Industries	-1.0%	HHI — Net Exported Goods	-0.5%	Long-Term Unemployment Rate	-1.1%
24	Private Foreign Investment	-1.3%	Private Foreign Investment	-1.2%	Private Foreign Investment	-1.5%
25	HHI — Net Exported Goods	-1.5%	Net Debt / GDP	-2.2%	Working-Age Population	-3.5%
26	Working-Age Population	-4.6%	Household Debt-to-Disposable Income Ratio	-4.6%	Net Debt / GDP	-5.8%
27	Household Debt-to-Disposable Income Ratio	-7.6%	Working-Age Population	-7.9%	Household Debt-to-Disposable Income Ratio	-12.2%
28	Imports	-12.6%	Imports	-9.8%	Imports	-12.9%
Total		**100%**		**100%**		**100%**

Notes

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The Québec Economic Barometer