ECONOMIC VIEWPOINT

Desjardins Leading Index: A Better Tool for Predicting Quebec's Economic Cycles

In the past, the Desjardins Leading Index (DLI) was able to accurately anticipate months in advance turning points in Quebec's economy. The DLI usually helped predict a change of direction in real GDP not only during recessions and recoveries, but also slowdowns. To ensure that the DLI is always exceptionally reliable and the best tool available to predict Quebec's economic cycles, it has undergone several major updates since its inception in 1990. Overall, an in-depth analysis confirmed that the DLI always met the highest performance criteria. Still, a recent update helped improve the way the new DLI picks up some of the Quebec economy's structural changes, especially those concerning international trade. Some indicators had become outdated over time and were replaced by new variables that were better at predicting turning points in real GDP. Below is a detailed description of this new version.

A Unique Barometer for 30 Years

The DLI helps anticipate turning points in Quebec's economy. Given that the province's business cycles do not simply mimic those observed in Canada and the United States as was shown by two earlier studies (*Special study: Economic history of Quebec over the past six decades* and *Comparative study of magnitude and length of economic cycles*), the DLI is an extremely useful gauge for identifying future changes to Quebec's economy. As a result, the DLI has proved to be a simple and effective tool (box on page 2) that helps detect early signs of a changing trend in the province's economy, which is why different stakeholders in business and government circles closely monitor monthly changes in the DLI to inform their decision-making.[1]

Quebec's Business Cycles

Identifying business cycles is at the heart of assessing the predictive capability of a leading indicator. Indeed, an economy's monthly turning points must first be clearly defined to understand to what extent the composite index can signal them. This helps determine its ability to effectively predict economic recessions and recoveries and the number of months in advance it can do so. This ability to pinpoint their start and end dates is the benchmark for evaluating the DLI's performance and guide possible improvements.

The monthly chronology of the Quebec economy's cycles was set based on changes in gross domestic product (GDP) in real terms. Below are the main observations that emerged. Quebec has gone through three recessions and three slowdowns[2] since the early 1980s, with the start and end of each one identified (table 1). The recent economic contraction started in March 2020

TABLE 1
Dating Quebec's economic cycles

TYPE	PEAK	TROUGH	LENGHT	INTENSITY
Recession	June 1981	July 1982	13 months	-5.7%
Slowdown	February 1989	June 1989	4 months	-0.8%
Recession	February 1990	January 1992	23 months	-5.4%
Slowdown	March 1995	February 1996	11 months	-0.4%
Slowdown	January 2001	May 2001	4 months	-0.1%
Recession	August 2008	May 2009	9 months	-2.4%
Recession	February 2020	-	-	-

PEAK: last month with a positive rate of growth; TROUGH: last month with a negative rate of growth; LENGHT: between the start and the trough (inclusive); INTENSITY: variation in real GDP between the trough and the peak.
Sources: Department of Economics of the University of Ottawa and Desjardins, Economic Studies

[1] The DLI newsletter, published monthly, looks at changes to the index and the short-term effects on the Quebec economy.

[2] A decrease in real GDP over two consecutive quarters or more does not necessarily signal a recession. There also needs to be a major decrease in economic activity. If the drop is small, it may represent a slowdown.

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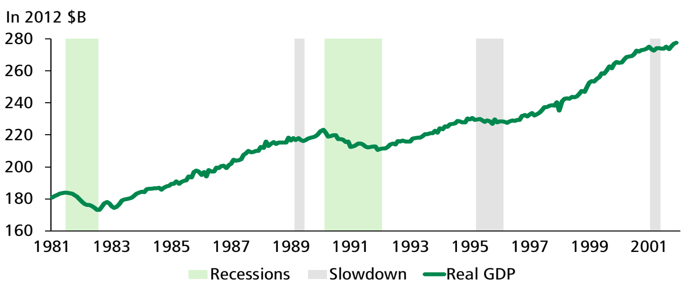
because of COVID-19, which led to non-essential activities shutting down for several weeks. Nonetheless, we will have to wait a few months before we can pinpoint the end and the magnitude of this recession. The risk of a resurgence of the disease and the possibility of a second lockdown in Quebec and elsewhere remain and could cause the economy to plummet again.

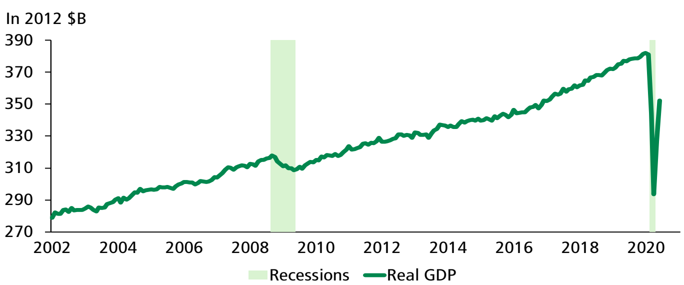
Of all the previous recessions, 1981–1982 was the worst. Economic activity fell sharply before real GDP was able to regain lost ground at the end of the following year. The contraction began in July 1981[3] before coming to an end a year later in July 1982. The situation was quite different during the 1990–1991 recession, since the recovery needed more time to take hold (graph 1). In fact, the economy began to falter again in March 1990; the actual recovery began nearly two years later after a long period of stagnation. Lastly, the third recession, which was shorter and less painful, occurred after the U.S. real estate market collapsed and the financial crisis hit. In Quebec, this economic contraction stretched from September 2008 to May 2009, a total of nine months (graph 2).

GRAPH 1
Recessions and economic slowdowns in Quebec from 1981 to 2001



Sources: Department of Economics of the University of Ottawa and Desjardins, Economic Studies

GRAPH 2
Recessions in Quebec from 2002 to 2020



Sources: Department of Economics of the University of Ottawa and Desjardins, Economic Studies

BOX
Role and Limitations of a Leading Indicator

The aim of a leading indicator is to predict imminent changes in the direction of economic activity. It is made up of statistics that have accurately indicated shifts in the economic situation in the past. Depending on the economic context, some indicators are better able to predict turning points than others. That is why they are grouped together in a single index called a composite, which helps pick up more accurate signals, thereby maximizing the effectiveness of this predictive tool. The end result is greater reliability than if each variable was analyzed individually.

For a leading index to be useful, it must be able to pick up signals well enough in advance, and the probability that it will emit a false signal must be low. A leading indicator sends a false signal when it indicates an economic downturn that does not happen. Therefore, this instrument is not infallible.

Economic agents, such as businesses and governments, worry more about a period of decline than a return to prosperity. Under these circumstances, the first role of a leading composite index is to predict a recession. As it only indicates trends, this predictive tool does not accurately determine the magnitude nor the length of future variations in global economic activity. A leading index does not aim to estimate future real GDP; its role is to spot changes in the direction that Quebec's economy will take down the road.

Since 1981, Quebec has also seen three economic slowdowns, i.e., a drop in activity that was neither big enough nor long enough to qualify as a recession. First, a slight four-month slowdown was observed in 1989, one year before the recession that began in March 1990. Next, the extent of the slowdown triggered in 1995 was small, but it lasted nearly a year. In fact, real GDP began to fall in April 1995 and did not rise again until the winter of the following year. After this, the 2001 slowdown proved to be both insignificant and brief.

Dating Quebec's economic cycles in this way confirms that its economy is changing in parallel with Canada's and the United States', but for a few small differences. The similarities with Canada's business cycles are obvious, but they differ in magnitude and length. There are certain times when the discrepancies are more significant. For example, the Canadian economy has been rocked by the oil industry's struggles affecting the producing provinces, while Quebec's economy has generally been spared. This confirms the need to have a composite index capable of detecting turning points that only apply to the

[3] The month after the cyclical peak.

Quebec economy. The DLI fulfills this role, since most of the variables that make up the index apply only to Quebec.[4]

An Improved DLI

An in-depth review of the DLI has just been completed, and the results are very encouraging. Overall, the in-depth analysis of the previous version of the DLI confirmed that it still met the highest performance criteria. Nonetheless, a few changes were made to correct some of the shortcomings and enhance its predictive capability. Some statistics, whose signals had faded over the years, were dropped and new variables added. The indicators selected signal early on each economic cycle's peak and trough.

The DLI: A Unique Approach

The DLI differs from the other leading indicators in Canada and the United States because of the group of variables (based on a variety of economic sectors) that make up its three distinct components. This method allows for a more accurate reading of the Quebec economy and better understanding of the strengths and weaknesses associated with the economic situation. The components that make up the DLI have been kept, although some variables within these components have been changed. This helps identify future trends in household consumption, the housing sector and business activity. A coincident indicator serves as a reference point for each component (table 2) to then determine the relevance of each variable included in the DLI's components.

TABLE 2
DLI components signal the future direction of various segments of the Quebec economy

COMPONENTS	COINCIDENT INDICATORS
Consumption	Consumer spending on goods and services in Quebec
Housing	Total spending in Quebec's residential sector
Business	Business investment in Quebec and exports outside Quebec (interprovincial and international)

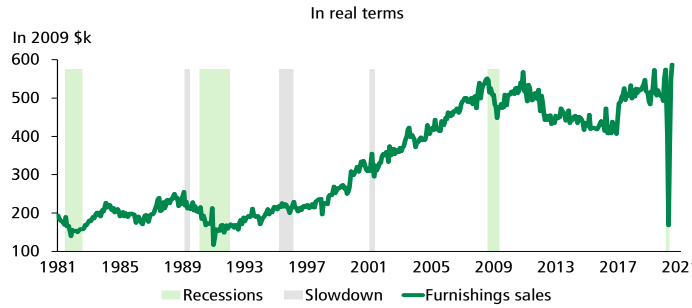
DLI: Desjardins Leading Index
Sources: Department of Economics of the University of Ottawa and Desjardins, Economic Studies

Households: The Pillar of the Economy

Consumer spending accounts for 60% of economic activity in Quebec, so it is important to detect any changing trends. Many statistics were tested based on their ability to predict spending on goods and services in Quebec and turning points in real GDP, both of which remain the most important benchmark for each of the DLI's indicators.

The purchase of durable goods such as motor vehicles and appliances tends to anticipate consumer spending and fluctuations throughout the entire economy (graph 3). This type of purchase–often made on credit–is affected more by changes in interest rates and the labour market than the purchase of lower-priced goods and spending on services is. Therefore, major purchases are more sensitive to changes in the economic situation. Following the analysis of their predictive capability, furniture, appliance and electronics sales remain part of the DLI.

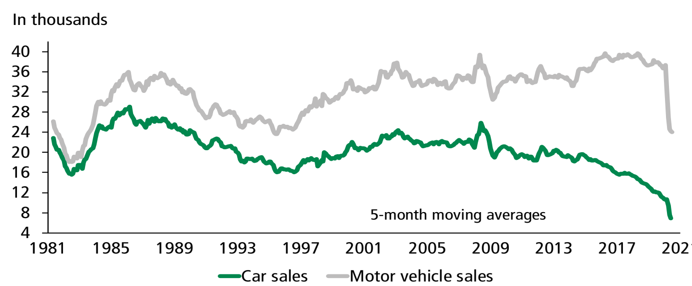
GRAPH 3
Furnishings sales are sensitive to changes in the economic situation



Sources: Statistics Canada and Desjardins, Economic Studies

In contrast, new car sales were replaced by motor vehicle sales that also include sport utility vehicles (SUVs) and minivans. Over the years, these models have gained in popularity at the expense of car sales, whose market share has shrunk (graph 4). This structural change has meant that the predictive capability of new motor vehicle sales is clearly higher than that of car sales alone. Consequently, this variable was replaced in the new version of the DLI (table 3 on page 4).

GRAPH 4
New motor vehicle sales have been more representative than car sales in the last 10 years



Sources: Statistics Canada and Desjardins, Economic Studies

[4] Except for interest rates in effect in Canada included in the "housing" component and the international trade index, the leading Canadian and U.S. indexes are included in the "business" component.

TABLE 3
New DLI: Change in variables used*

DLI "consumption" component

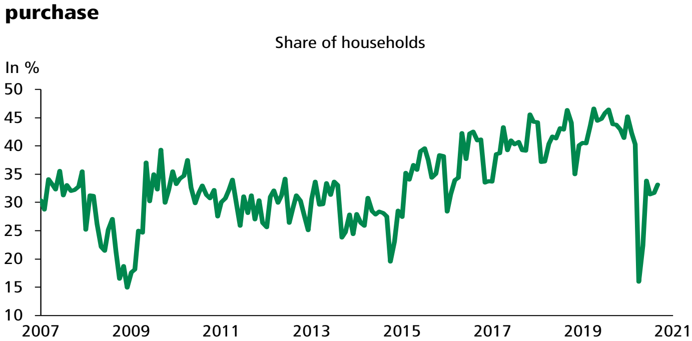
PREVIOUS VERSION	IMPROVED VERSION
➢ Furniture, appliance and electronics sales ➢ New car sales ➢ Employment insurance claims ➢ Consumer confidence index	➢ Furniture, appliance and electronics sales ➢ New motor vehicle sales ➢ Employment insurance claims ➢ "The right time to make a major purchase depending on the consumer"

DLI: Desjardins Leading Index; * All indicators apply to Quebec.
Sources: Department of Economics of the University of Ottawa and Desjardins, Economic Studies

Employment insurance claims (initial and renewed), which reflect the dynamics of the labour market, were kept. Employment insurance claims increase when the economy suffers a slowdown along with layoffs. The opposite trend in employment insurance claims is an excellent leading indicator of consumer spending and real GDP.

Another variable was changed in the "consumption" component, namely household confidence. This variable proved to be excellent in predicting months in advance most of the turning points in consumer spending and real GDP, albeit a little too slowly sometimes. In an effort to correct this shortcoming, different survey sub-questions on household confidence were tested. The question assessing household intentions to purchase something expensive (graph 5), such as furniture or a motor vehicle, proved to be highly effective. This indicator identifies well in advance when consumption and the economy change course. Thanks to the changes made, the predictive capability of this DLI component is better than the previous version's and spots turning points in real GDP five months in advance. The four statistics selected can flag any shifts in consumer spending and Quebec's economic cycles ahead of time.

GRAPH 5
Few Quebecers feel that this is the right time to make a major purchase



Sources: Conference Board of Canada and Desjardins, Economic Studies

Predicting Residential Spending

The aim of the DLI's "housing" component is to predict turning points in Quebec's residential sector and the economy in general. According to the GDP-at-market-prices approach, residential spending falls into three distinct categories: spending on new construction, spending on renovations, and property transfer-related costs. Several avenues were explored to improve the "housing" component, which was already performing well in the previous version of the DLI.

Sales of existing properties anticipate residential sector spending, including renovations, by several months, since the new owner often tends to renovate a few months after the purchase. The amounts allocated to renovating take up nearly half of the amount spent on investing in the housing, hence the importance of predicting its trend. Property sales are a good indicator of the housing market and often anticipate fairly well when the economy is changing direction. Therefore, this variable was kept in the new version of the DLI.

Changes in interest rates tend to signal a turning point in residential spending and easily anticipate a shift in Quebec's economic cycles. To take into account the different types of interest rates that a property buyer can access, one-year and five-year fixed mortgage rates were selected, as in the previous version of the DLI. These variables continued to meet the selection criteria.

An indicator was added to capture the share of borrowers who opt for a variable interest rate, i.e., a rate that changes after the Bank of Canada announces a key rate hike or cut. Including key rates in addition to 1-year and 5-year mortgage rates increased the DLI's predictive capability. The three types of interest rates are used to create a single variable through averaging. Obviously, interest rates must be inverted for use in this calculation, since the residential sector, like the economy, reacts positively to a drop in the cost of borrowing. Even though this indicator can fluctuate based on the vagaries of the financial markets, its significant lead justifies including it in the "housing" component and the DLI.

Residential building permits issued by municipalities indicate the intention of individuals and builders to begin work. About 80% of the permits are generally issued for new construction and around 20% for renovations. The delay between the permit being issued and shovels in the ground is usually several months, so this statistic has a solid lead.

Housing starts represent the first step in the construction process and, as a result, anticipate the cost of labour and materials for new construction. And, while housing starts and building permits are closely linked from a statistical point of view, building permits have a better predictive capability to anticipate downturns and recoveries. That is why this indicator was kept and housing starts removed from the calculation of the DLI's "housing" component (table 4).

TABLE 4
New DLI: Change in variables used*

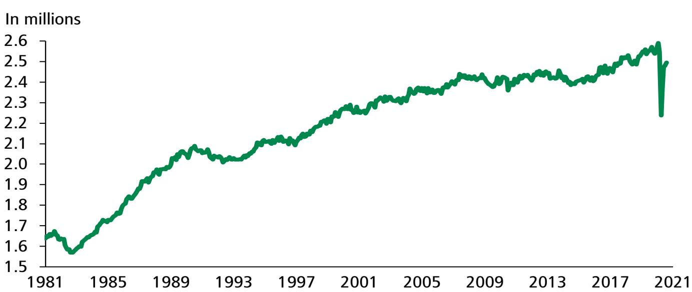
DLI "housing" component

PREVIOUS VERSION	IMPROVED VERSION
➢ Existing home sales ➢ Fixed mortgage rates (1-year and 5-year) ➢ Residential building permits ➢ Residential housing starts	➢ Existing home sales ➢ Fixed mortgage rates (1-year and 5-year) and key rates ➢ Residential building permits ➢ Full-time employment among those aged 25 to 54

DLI: Desjardins Leading Index; * All indicators apply to Quebec except interest rates, which apply to Canada.
Sources: Department of Economics of the University of Ottawa and Desjardins, Economic Studies

Aside from interest rates, a key element of a property purchase is having a job that generally guarantees a stable income. To incorporate this reality into the "housing" component, different tests were conducted using the full-time employment rate for different age groups. Several statistics proved significant, and the one that posted the best results was selected, namely full-time employment among those aged 24 to 54 (graph 6). Adding this variable was the main change to the "housing" component.

GRAPH 6
Full-time employment among those aged 25 to 54 accurately anticipates Quebec's residential-sector and economic cycles



Sources: Statistics Canada and Desjardins, Economic Studies

Each of the "housing" component's indicators has a four-month lead on average compared to spending in this sector. The turning points are accurately anticipated, just like those of the economy in general. The average lead at the peak and trough of the "housing" component of the DLI is four months compared to real GDP.

Business Activity Barometer

The aim of the "business" component is to predict investments in Quebec businesses and the province's exports. A coincident indicator was therefore created to capture these two facts and select the statistics that best predict changes in business activity trends.

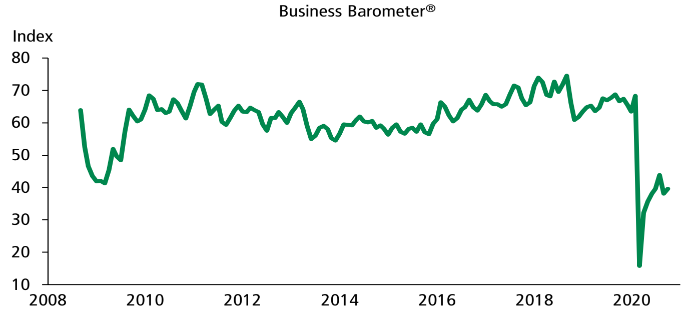
Stock market changes in general feel the pulse of businesses' financial health, for they usually reflect investor expectations regarding corporate profits. Even though they have an undeniable predictive nature, they can sometimes be misleading in certain situations. For example, financial scandals, the budget concerns of one or more countries, and global political or health developments can influence international stock markets without necessarily having an impact on Quebec's economy. Using a regional index that concerns only Quebec can limit the repercussions of these events on the DLI's "business" component and, as a result, on the leading index. However, the Quebec index is not completely shielded from the fluctuations of North American and international stock market indexes.

The Québec-30 stock market index (QI-30) was selected once again to be included in the DLI. This indicator is built on the stock market indexes of 30 companies headquartered in the province and listed on a North American stock market. This helps to better target investor expectations regarding securities that reflect the province's industrial structure. Besides adding a little Quebec flavour to the DLI's "business" component, the QI-30 shows the distinctive dynamics of Quebec's industrial sector. This stock market index anticipates fairly well the trajectory of the province's investments and exports several months in advance. Still, caution is called for, for some false signals have been sent in the past, a drawback that usually characterizes stock market indexes.

Furthermore, to take into account Quebec's business climate, the Canadian Federation of Independent Business (CFIB) small and medium-sized enterprises (SME) confidence index still has its place in the make up of the DLI. This variable continues to have an excellent predictive capability for investments, exports and real GDP. Moreover, it reacts quickly to situational changes, as was the case with the COVID-19 crisis (graph 7).

GRAPH 7
SME confidence has hardly increased since the unprecedented drop in spring 2020

Business Barometer®



Sources: Canadian Federation of Independent Business and Desjardins, Economic Studies

The province must export a significant amount of its output to compensate for the relatively small size of its domestic market. Therefore, it's important to detect in advance a change in course of shipments to points outside Quebec. Approximately 40% of the province's exports flow to the rest of the country, whereas 60% are destined for international markets, mostly the United States. Canada's leading indicator, which is published by the Organisation for Economic Co-operation and Development (OECD), is able to anticipate fairly well shipments from Quebec to the other Canadian provinces. Therefore, this variable was kept in the new DLI.

A few changes were made to better take into account the international context, which influences international demand for Quebec products and services. In the past, the Conference Board's leading U.S. indicator, which is included in the DLI to anticipate demand south of the border, was used. A similar index published by the OECD was tested, and the results proved to be better for signalling a change of direction in business activity and real GDP's cyclical turning points. So, the OECD's U.S. composite index replaced the Conference Board's in the new version of the DLI. The OECD's leading indexes for the Canadian and U.S. economies are good at anticipating their business cycles and, as a result, the probable direction of Quebec's exports to these markets.

Roughly 70% of Quebec's international exports are shipped to the United States, far fewer than the 85% peak of about 20 years ago. Shipments abroad from the province have diversified geographically, especially those to Europe and Asia. To capture this change better, a few tests were conducted to assess whether it made sense to include international indexes. The global trade index published by the CPB - Netherlands Bureau for Economic Policy Analysis (graph 8) provided conclusive results that justified adding it to the "business" component and, in turn, the DLI (table 5).

GRAPH 8
The international trade index reacted strongly to changes in the economic situation

Sources: CPB - Netherlands Bureau for Economic Policy Analysis and Desjardins, Economic Studies

TABLE 5
New DLI: Change in variables used*

DLI "business" component

PREVIOUS VERSION	IMPROVED VERSION
➢ Québec 30 stock index ➢ SME confidence index ➢ Leading index for the United States (Conference Board) ➢ Leading index for Canada (OECD)	➢ Québec 30 stock index ➢ SME confidence index ➢ Leading index for the United States (OECD) ➢ Leading index for Canada (OECD) ➢ International trade index

DLI: Desjardins Leading Index; OECD: Organisation for Economic Co-operation and Development;
* The Québec 30 Index and the SME confidence index are the only variables that apply to Quebec.
Sources: Department of Economics of the University of Ottawa and Desjardins, Economic Studies

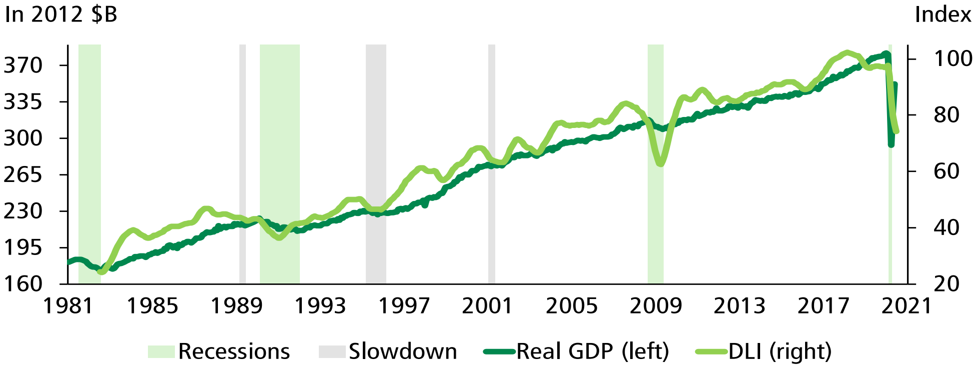
The "business" component's four indicators anticipate their activities well in advance by measuring the combined changes in exports and investments. The component's lead on average is four months from the peak and five months from the trough of economic activity. The turning points in exports and investments are anticipated ahead of time just like those of real GDP in general.

A New, High Performance Yet Fallible DLI

In addition to pinpointing Quebec's cyclical position, the DLI is an indicator of the economy's likely course several months in advance. The new DLI has successfully predicted the shifts in activity since the early 1980s. Specifically, it anticipated recoveries by five months on average and recessions or slowdowns by six months. Its ability to anticipate Quebec's business cycle and its reliability make the DLI an excellent planning tool (graph 9 on page 7). Furthermore, it is especially effective for predicting an economic slowdown, which is of prime importance in the development of economic policies and business planning. The DLI would have to experience several major declines to signal a period of economic contraction. A small decrease, whether it is a one-off or not, is no cause for alarm. This kind of situation happens fairly often without endangering the economic cycle.

On the other hand, the shock caused by the "Great Lockdown" in Quebec, as elsewhere, was so sudden that the DLI could not predict in advance the economic contraction that would hit the province. The deterioration was immediate and extensive around the globe. Moreover, this time, it is public health crisis rather than an economic one. As a result, the leading composite indicators in Europe, the United States and Canada were unable to play their usual role, i.e., to signal an economic downturn a few months in advance.

GRAPH 9
The DLI accurately anticipated the economic cycles between 1981 and 2020



DLI: Desjardins Leading Index
Sources: Department of Economics of the University of Ottawa and Desjardins, Economic Studies

Therefore, the DLI, which is specific to Quebec, was unable to avoid this unusual situation like most of the other leading indicators around the world. The leading index of Quebec's economy, which was already showing signs of weakness before the COVID-19 crisis, still fell to an unprecedented low as early as March, then worsened in April, although some economic indicators were even more negative. Nonetheless, the DLI will be useful for tracking the economic recovery, which has already begun as businesses gradually reopen. Under these circumstances, recent and future monthly newsletters will be extremely helpful.

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