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Determination of Quebec's quarterly real GDP and analysis of the business cycle, 1948-1980

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Abstract

This study aims to consolidate the economic history of Quebec over the period from 1948 to 1980. Unlike previous economic studies relating to this period, we identify the chronology of the economic cycle of Quebec by estimating the real quarterly GDP by using the method of Ginsburgh (1973) as modified by De Carufel and Lizotte (1982). Our analysis of the duration and intensity of recessions confirms the presence of regional cycles in Canada. It shows also that the business cycle of Quebec is more strongly correlated with the US cycle than with the cycle in the rest of Canada.

Keywords: GDP, quarterly frequency, business cycle, Ginsburgh's method and 1948-1980.

Code JEL: N12, N92, C22

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INTRODUCTION

Business cycle dating has long been a topic of interest to researchers. In the United States, the Business Cycle Dating Committee of the National Bureau of Economic Research (NBER) has been establishing and maintaining this chronology since 1920. Between the recession of 1854 and the one associated with the financial crisis of 2008-2009, this committee has identified 34 troughs and 33 peaks. It is the availability of long historical series on economic activity that has made it possible to reconstruct 170 years of business cycle history. In the Euro zone, this work is carried out by the Euro Area Business Cycle Dating Committee. In Canada, this role was held from the 1980s onwards for three decades by Philip Cross, Chief Economist at Statistics Canada. It was in 2012, at the initiative of the C.D. Howe Institute, that the Business Cycle Dating Council was created and took over from Statistics Canada.

Dating can be monthly, depending on data availability, but is generally quarterly, requiring high-frequency aggregate economic data available over a long period of time. Compared with the United States, Canada is relatively deficient in this area, since the active series of quarterly real GDP and its components began in 1981 only. These series must be linked to earlier quarterly estimates available from 1947 to 1997 to construct a coherent chronology. By combining Canadian real GDP data with other coincident indicators of real economic activity, Cross and Bergevin (2012) were able to establish the timing and severity of twelve recessions in Canada between 1927 and 2012.

Provincial business cycles in Canada are more difficult to establish, and work on the subject remains relatively sparse. Provinces are both contributors to overall economic activity and are influenced by national economic trends. Most of the provincial business cycle analysis have been performed in the province of Quebec. Key studies on this issue include Linteau et al (1960), Raynauld (1961), Vallières (1973), Fortin (1980), Hébert (1989), Linteau et al (1989), Dickinson and Young (1992) and Dauphin (2007).

Dating the Quebec business cycle is problematic since provincial GDP data prior to 1981 were published on an annual basis and only nominal values are available. Our paper is set in this context. We use the available information on the annual values of Quebec's GDP covering the period 1926 to 1986 as well as certain quarterly variables related to Quebec economic activity that have been produced and published since 1948 to construct a quarterly estimate of Quebec's real GDP from 1948 to 1980. These estimates are then used to establish the peaks and troughs of Quebec's GDP, with the aim to enrich our understanding of post-WWII economic history.

To carry out this work, we use the methodology proposed by Ginsburgh (1973) as modified by De Carufel and Lizotte (1982). This method uses movements in quarterly indicator variables to construct quarterly estimates of real GDP that are both fully consistent with the annual estimates while minimizing interannual discontinuities. The indicator variables used in the reconstruction are the value of retail trade, the industrial employment index for Quebec, the number of housing starts, and quarterly real GDP for the United States. From the estimates of Quebec's real GDP it is possible to compute by subtraction the real GDP of Canada without Quebec (Rest of Canada-ROC). This procedure will show that for the period under study, the Quebec business cycle has more similarities with the U.S. cycle than with the cycle in the rest of the country. We can therefore conclude that the Canadian dating of Cross and Bergevin (2012) includes important regional variations.

The outline of the article is as follows. In the next section, we review existing studies on the Quebec business cycle. The modified Ginsburgh method is presented in section 2 and we follow in section 3 with a description of the data used. In the next section (section 4), we present the quarterly real GDP series and analyze the results. We then compare the Quebec cycle with that of the ROC and the United States (section 5) before concluding (section 6).

1. PREVIOUS WORK ON THE POST-WW II ECONOMIC HISTORY OF QUEBEC

Several authors have described and analyzed the economic and social stylized facts of Quebec between 1945 and 1980 in an attempt to identify the post-war periods of expansion and recession. According to Hébert (1989), this period begins with a recession in Quebec in 1945-46 during the transition from a war economy to a peace economy, reviving fears of a return to the chronic unemployment of the 1930s (Fortin, 1980). But economic activity recovered strongly from 1947 to 1953, following a marked increase in investment (Linteau et al., 1989), allowing a ten-year increase in real personal income in Quebec of 52.9% over the 1940-1950 decade (Dauphin, 2007). Despite the strength of this growth, it was not until 1952-1953 that Quebec regained a real GDP comparable to that observed towards the end of WW-II (Vallières, 1973).

Linteau et al. (1960) and Hébert (1989) identify two recessions in Quebec during the 1950-1960 decade, in 1953 and 1957-58, the first linked to the end of the Korean War, while the second, more important, would have resulted from an economic slowdown in the United States and the end of construction work. According to Raynauld (1961) and Vallières (1973), however, these recessions would have been shorter

than in the other provinces of Canada because of the importance of the manufacturing and construction industry in Quebec and its smaller share of agriculture.

The 1960s and early 1970s exhibit a completely different picture. According to Hébert (1989) and Linteau (1989), major expenditures on public infrastructure, such as Expo 67, the Montreal subway, major investments in the manufacturing industry and residential and commercial construction allowed Quebec to experience uninterrupted expansion between 1961 and 1974. This growth was accompanied by important changes in the economic structure of Quebec. Thus, between 1961 and 1981, the primary sector's share of Quebec's GDP decreased from 12.4% to 4.6% in 1981 and that of the secondary sector from 35.9% to 26.3%, while the service sector saw its share increase from 51.7% to 69.1% (Dickinson and Young, 1992). At the same time, the role of the government has increased dramatically with the creation of numerous state-owned corporations in sectors as diverse as energy, mining, steel, insurance and finance, and forestry (Dickinson and Young, 1992; Linteau et al., 1989; Dauphin, 2007).

Despite this sustained economic growth in Quebec, Hébert (1989) and Linteau et al (1989) mention a certain economic slowdown in 1967-1968, followed by very slow growth in 1970-1971 due mainly to the end of major construction projects. However, it is the first oil crisis and the fall in the prices of other commodities that is the most striking event. According to Hébert (1989), this crisis translated in Quebec into a recession in 1973-1974, a recession that Linteau et al. (1989) positioned instead in 1974-1975. They also point out that, as in many countries, inflation and unemployment were rising sharply in Quebec. Thus, the consumer price index (CPI) in Montreal, normalized to 100 in 1971, reached 208.4 in 1980, an average annual increase of 8.5% over the period. As for unemployment, it hovered around 7% during the first half of the decade but reached 10% in 1977. The end of the decade was characterized, according to Hébert (1989), by weak consumer spending on durable goods, business investment and residential construction, which was held back by the strong rise in nominal interest rates.

This review of the main economic cycles identified in the literature serves as a backdrop for our work of identifying the chronology of the Quebec economic cycles during the period under study. In the following section, we present the method we used to estimate quarterly real GDP.

2. COMPUTING QUARTERLY VALUES FROM ANNUAL DATA

Producing quarterly estimates from annual data is a delicate exercise. One must seek the best quarterly data series in terms of accuracy and relevance that remain consistent with the available annual values. Among the existing methods for creating variables at quarterly frequency, a distinction is made between smoothing methods and correlation methods, the latter using exogenous indicator variables. The method of Denton (1971) falls into the first category, while those of Chow and Lin (1971), Ginsburgh (1973), Fernández (1981) and Litterman (1983) fall into the second category.

Denton (1971) notes that for several variables, the annual addition of quarterly values from one source does not always agree with annual values from another source. The fundamental problem in fitting quarterly time series is to make the quarterly values thus generated consistent with the annual series without causing an artificial discontinuity at the change of year. Ginsburgh has best expressed a solution to this problem, the main elements of which are presented below.

Let us consider $y_i, i=1,2,\dots,4n$ the vector $4n \times 1$ of quarterly unobserved values of the variable of interest, $X_{k,i}, k=1,2,\dots,p; i=1,2,\dots,4n$ the matrix $4n \times p$ of quarterly observations of p indicator variables related to y_i by the linear model:

$$y = X\beta + u \tag{1}$$

where β is the $p \times 1$ vector of coefficients indicating the effect of the indicator variables on y_i . Consider also $y_j^*, j=1,2,\dots,n$ observed annual values of the variable for which quarterly values are to be calculated. Ginsburgh (1973) proposes a three-step method. In the first step he aggregates¹ the indicator variables X^* into annual variables and estimates the following relationship on the annual data:

$$Y^* = X^* \hat{\beta} + \hat{u}^* \tag{1}$$

where $\hat{\beta}$ is the vector of estimated coefficients and \hat{u}^* the vector of n annual residuals. In a second step, Ginsburgh calculates from the annual residuals a series of quarterly residuals $\hat{\mu}$. These estimates are obtained by solving a constrained minimization problem aimed at creating quarterly residuals that fluctuate as little as possible while maintaining perfect equality between the aggregation of the quarterly residuals

¹ Depending on the nature of the variables, aggregation consists of either summing the quarterly data or taking the average of the quarterly values.

thus generated and the annual residuals calculated in step 1. This requires solving the following minimization problem:

$$\text{Min } \sum_{i=2}^{4n} \Delta \hat{u}_i^2 = \sum_{i=2}^{4n} (\Delta y_i - \Delta x_i \hat{\beta})^2 \text{ s. c. } \sum_{j=4i-3}^{4i} y_j = y_j^*, j=1, 2, \dots, n. \quad (2)$$

Finally, in the last step he obtains the quarterly values by adding the residuals calculated in the previous stage to the quarterly values predicted by the regression coefficients estimated in the first step, i.e.:

$$\hat{y}_i = X_i \hat{\beta} + \hat{u}_i, i=1, 2, \dots, 4n \quad (3)$$

De Carufel and Lizotte (1982) point out that since Ginsburgh's method is based on rates of change in residuals, it does not allow the first quarterly observation to be calculated. This can be seen by observing that the function to be maximized in (2) has only $4n-1$ terms. To circumvent this problem, De Carufel and Lizotte (1982) modify Ginsburgh's method by assigning an initial value \hat{u}_0 to be determined that allows a predicted value to be calculated for the 1st observation. The minimization problem to be solved is then posed as follows:

$$\text{Min } \sum_{i=1}^{4n} \Delta \hat{u}_i^2 = \sum_{i=1}^{4n} (\Delta y_i - \Delta x_i \hat{\beta})^2 \text{ s. c. } \sum_{j=4i-3}^{4i} y_j = y_j^*, j=1, 2, \dots, n. \quad (4)$$

We notice that with respect to equation (2) the summation of the function starts at $i = 1$. This problem is solved by posing the following Lagrangian function:

$$\mathcal{L} = \sum_{i=1}^{4n} \Delta \hat{u}_i^2 = \sum_{j=1}^n \lambda_j (\sum_{i=4, j-3}^{4j} (\hat{u}_i - \hat{u}_j)) \quad (5)$$

De Carufel and Lizotte (1982) present the complete algebraic solution of which we outline here only the main elements. The vector of quarterly residuals \hat{u} is determined through the minimization of the quadratic form under n additivity constraints $C\hat{u} = \hat{u}^*$, where C is a $n \times 4n$ matrix to allow the conversion of quarterly variables by summing the annual and quarterly variables and V the variance matrix of the residuals of the quarterly relationship. In matrix form the Lagrangian is written as follows:

$$\mathcal{L} = \hat{u}' V^{-1} \hat{u} - 2\lambda(C\hat{u} - \hat{u}^*) \quad (5')$$

The initial value \hat{u}_0 can be calculated from the structure of the residue correlation matrix by imposing an initial value of zero. According to De Carufel and Lizotte (1982), the usefulness of their method depends primarily on the validity of the assumed regression model and the possibility of finding indicator variables.

Chow and Lin (1971) propose a method for estimating quarterly values that differs from Ginsburgh's in the approach taken to determine quarterly residuals. Their method proposes three choices for the correlation structure of the quarterly residuals, either uncorrelated, autocorrelated of order 1 or autocorrelated of order 1 and 4. The quality of the result therefore depends on the correct specification of the model and the variance-covariance matrix used. The methods of Fernández (1981) and Litterman (1983) are similar to those of Chow and Lin (1971). Fernandez's (1981) method, unlike Chow-Lin's (1971), considers that the quarterly series of residuals follows a random walk process. Litterman (1983) proposes a generalization of Fernandez's (1981) model by considering a random walk with autocorrelated shocks.

At the theoretical level, it is difficult to know which method is superior because the empirical literature gives few lessons on their relative performance. After applying the Chow-Lin, Fernández, and Litterman methods to annual data on Haiti's real GDP, Cayemite (2009) concludes that the Chow-Lin method produces more robust quarterly estimates than the other two approaches. In constructing quarterly values of Pakistan's annual GDP, Rashid and Jehan (2013) conclude that the Denton and Chow-Lin methods produce similar trends regardless of the indicator variables. For our purposes, we retain the conclusions of De Carufel and Lizotte (1982). Indeed, having carried out a goodness-of-fit test of the annual regression with this and other methods, notably those of Chow and Lin (1971) and Ginsburgh (1973), they conclude that the modified Ginsburgh method tends to produce estimates with a lower mean square error. Our choice is also motivated by the fact that the modified Ginsburgh method is the one employed by the *Institut de la Statistique du Québec* (ISQ) to produce the data published in the Quarterly Economic Accounts of Quebec. Finally, with the exception of De Carufel and Lizotte (1982), the studies reviewed use a single indicator variable to calculate quarterly values. In our study we use several quarterly variables, all correlated with the annual real GDP, to determine the quarterly real GDP of Quebec.

3. THE DATA

Quebec's annual nominal GDP is available at the ISQ from 1926 to 1986. Creating a series of quarterly real GDP from this variable requires two steps: converting nominal values into real values using a relevant price index and then creating the quarterly movements. For the first step, we calculated Quebec's real GDP

(RGDP_QC) by dividing it by the implicit price index (or deflator) of Canadian GDP. To obtain the quarterly frequency from Quebec's annual GDP, the indicator most frequently used by the ISQ is the quarterly industrial production index, a series that is unfortunately not available for the period considered in our study.

By exploring historical publications, we have identified six potentially relevant quarterly series that are available on an ongoing basis between 1948 and 1981. These series are the number of Employment Insurance claimants (EICLAIM_QC), the value of retail trade (SALES_QC), the general industrial employment index (EMPLOY_QC), the number of housing starts (CONSTR_QC), Canadian real GDP (RGDP_CA), and U.S. real GDP (RGDP_US). The real value of retail trade is obtained by dividing its nominal value by the Canadian CPI. The Quebec Industrial Employment Index (EMPLOY_QC) is a monthly variable. Through the chain index formulas, we have harmonized the reference dates for all the indices (1981=100) which we then converted into quarterly and annual indices by a simple average calculation. As for the monthly variables SALES_QC, CONSTR_QC and EICLAIM_QC they were converted into quarterly and annual variables by summing the monthly values. The GDP deflators for Canada and the United States and the Canadian price index were then brought back to a base 100 in 1981. The real values of the variables must therefore be interpreted in constant 1981 dollars. Table 1 presents the variables, their periods of availability and their sources: the Institut de la statistique du Québec (ISQ), the Bureau of Economic Analysis (BEA) in the United States, Statistics Canada and the Federal Bureau of Statistics (FBS), which became Statistics Canada in 1972.

Table 1 : Variables available for constructing quarterly data

Name of variables	Description of variables	Availability	Sources
EICLAIM_QC	Number of Employment Insurance (formerly Unemployment Insurance) claimants.	1943-1981	Statistics Canada
SALES_QC	Sales value of department stores, general merchandise stores and all other stores, in millions of current dollars.	1948-1980	BFS
EMPLOY_QC	Standardized level of employment in the industrial sector in Quebec.	1943-1981	BFS
CONSTR_QC	Number of housing starts in Quebec.	1948-1980	BFS
RGDP_CA	Canada's Real Gross Domestic Product.	1947-1986	Statistics Canada
GDP_US	Current dollar value of total U.S. production measured in billions of U.S. dollars.	1947-1981	BEA
DEFLAT_CA	Canadian GDP deflator.	1926-1986	Statistics Canada
DEFLAT_US	U.S. GDP deflator.	1947-1981	BEA
CPI	Consumer Price Index for Canada.	1943-1981	Statistics Canada

With the exception of real GDP for the United States and Canada, which are already seasonally adjusted, the other quarterly variables all contain a seasonal movement, which may also include a calendar effect. We have extracted these movements by applying the X12-ARIMA seasonal adjustment procedure recommended by Statistics Canada (2014), available on Eviews, to keep only the trend-cycle of the quarterly variables.

To apply the first step of the modified Ginsburgh method, we must estimate on annual data which combination of the six potential variables is most strongly correlated with Quebec's real GDP. The model selected was based on three criteria, namely the exclusion of non-significant variables in order to retain a limited number of variables, while having a model with the highest and lowest adjusted R2 value of the Akaike information criterion. The estimation was performed on the logarithm of the variables in order to stabilize the variance and we verified that the variables were of the same order of integration and were cointegrated in order to limit the problem of spurious correlations. After this analysis, *EICLAIM_QC*, *CANPIB* and *CONSTR_QC* were found to be insignificant so that we retained only three variables, namely *EMPLOY_QC*, *SALES_QC* and *USPIB*. Applying the second and third steps of the modified Ginsburgh method, we obtain estimates of quarterly real GDP for Quebec, the values of which are presented in Appendix 1 and the rates of change in Appendix 2.

4. DATING QUEBEC'S ECONOMIC CYCLE

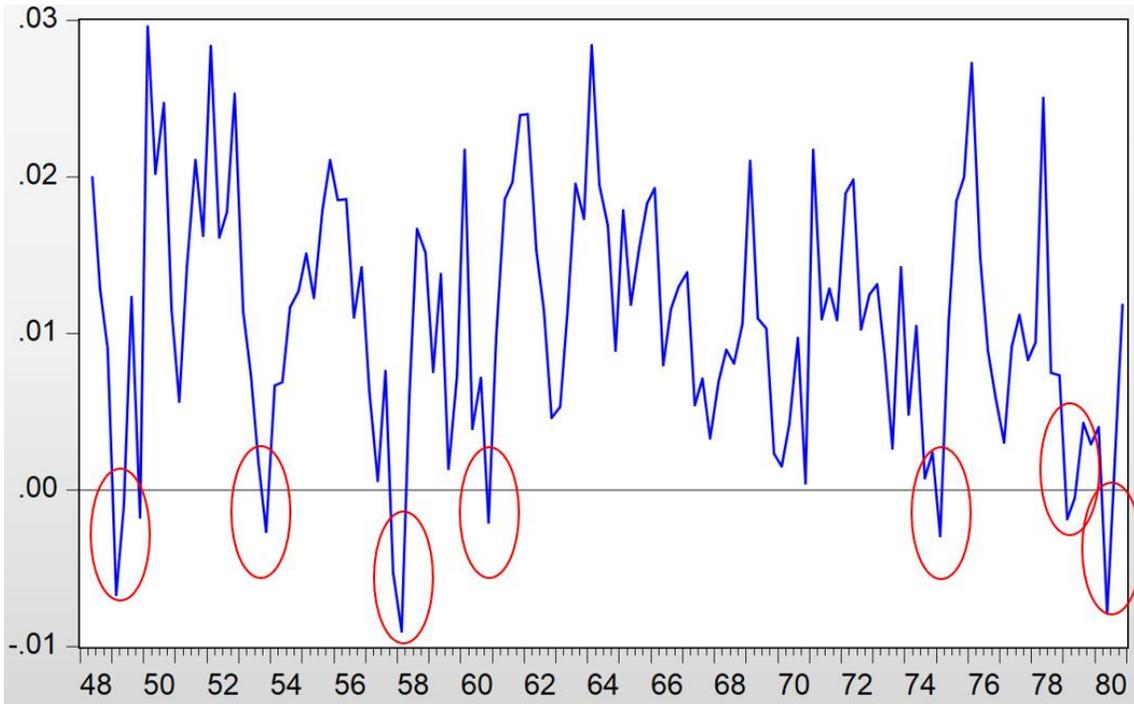
The chronology of the business cycle consists in identifying the turning points of the real GDP, i.e. the cyclical peaks and troughs that separate the expansionary phases from the periods of recessions. Historically, the criterion most often used to identify recessions is the presence of two consecutive quarters of decline in real GDP. It is this usual criterion that Kaboré et al. (2014) and Kaboré (2014) used to establish a sequence of expansions and recessions in Quebec over the period 1948-2014.

Despite this apparent simplicity, establishing such a chronology remains a tricky exercise because there is no single rule for identifying turning points. Ultimately, only an educated assessment that takes into consideration several dimensions of an economic downturn, such as its effect on employment, the extent of the decline, or its diffusion in multiple sectors allows to qualify a slowdown as a recession. For example, although the usual criterion of two consecutive quarters of real GDP decline was observed in Canada in 2015, the Canadian Business Cycle Council judged that the magnitude of the GDP decline was too weak and the number of sectors in decline too limited to characterize this episode as a recession.

To establish the chronology of Quebec's economic cycles in the following pages, we rely on two different notions to identify a recession. The first is the presence of a decline in quarterly real GDP. Note that our data do not allow us to formally apply the so-called 3D criteria (duration, depth, diffusion) usually used for dating the cycle as initially proposed by Burns and Mitchell (1946), because diffusion is not measured. We will therefore consider only the duration and the importance of the decline in order to identify recessions. But we will also judge according to a second criterion, that of the presence of a significant deviation of the GDP from its trend, commonly known as the deflationary deviation. The idea here is to combine the identification of the peaks and troughs of the real GDP with the cycle based on deviation from the trend as proposed by Mintz (1969). The importance of the second criterion is justified by the fact that real GDP in Quebec progressed much faster in the 1950s and 1960s than it did in the 1970s. To calculate the deviation from the trend, we will use the customary Hodrick and Prescott filter method with a smoothing parameter of 1600 to estimate the trend in quarterly GDP.

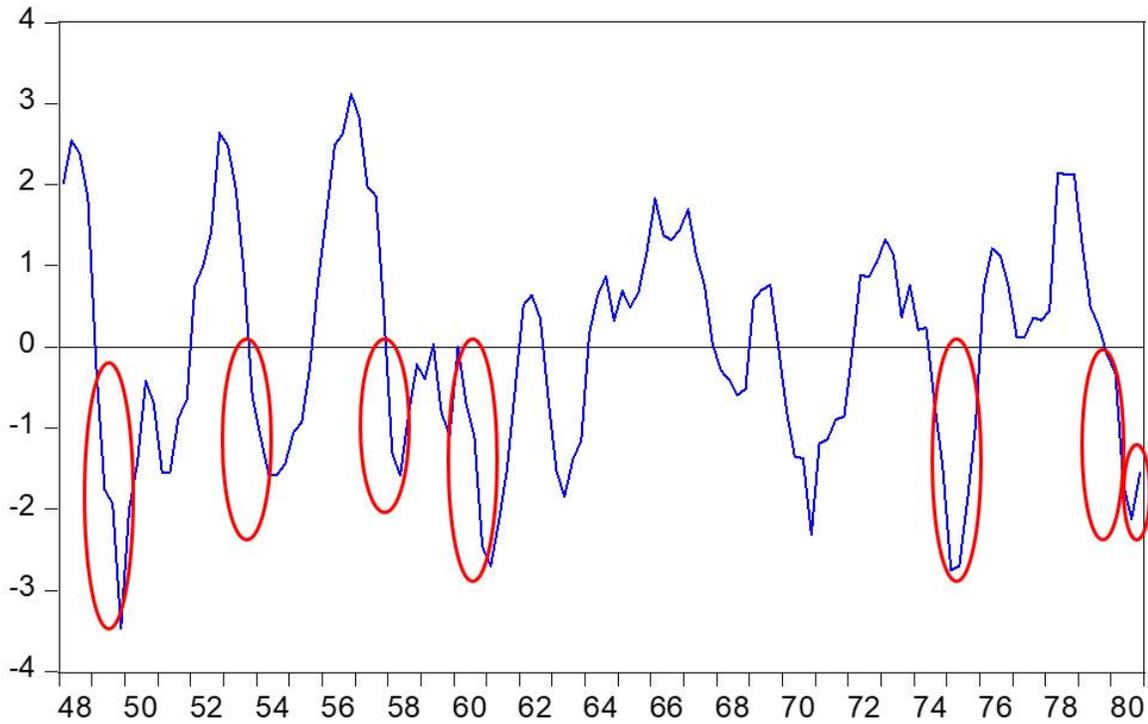
Let us first consider the initial criterion, which is based on the GDP growth rate shown in Figure 1. Only three episodes characterized by two consecutive declines in quarterly GDP are identified: 49Q1 and 49Q2, 57Q4 and 58Q1, and 79Q1 and 79Q2. Real quarterly GDP also declines in five other quarters, namely 49Q4, 53Q4, 60Q4, 75Q1, and 80Q2. Since the decline in 49Q4 is separated from the decline in the first two quarters only by a brief rebound in GDP in 49Q3, 1949 is typical of a double-dip recession and we consider it as a single episode. According to the GDP decline criterion, we thus identify 7 episodes that could be characterized as a recession, circled in red in Figure 1. Figure 2 shows the deviation from the GDP trend for the same episodes.

Figure 1 : Quebec's real quarterly GDP growth rate



Source: Authors' calculation. Episodes of potential recession are highlighted by red circles.

Figure 2 : The deviation from the trend in Quebec's GDP (in percentage)



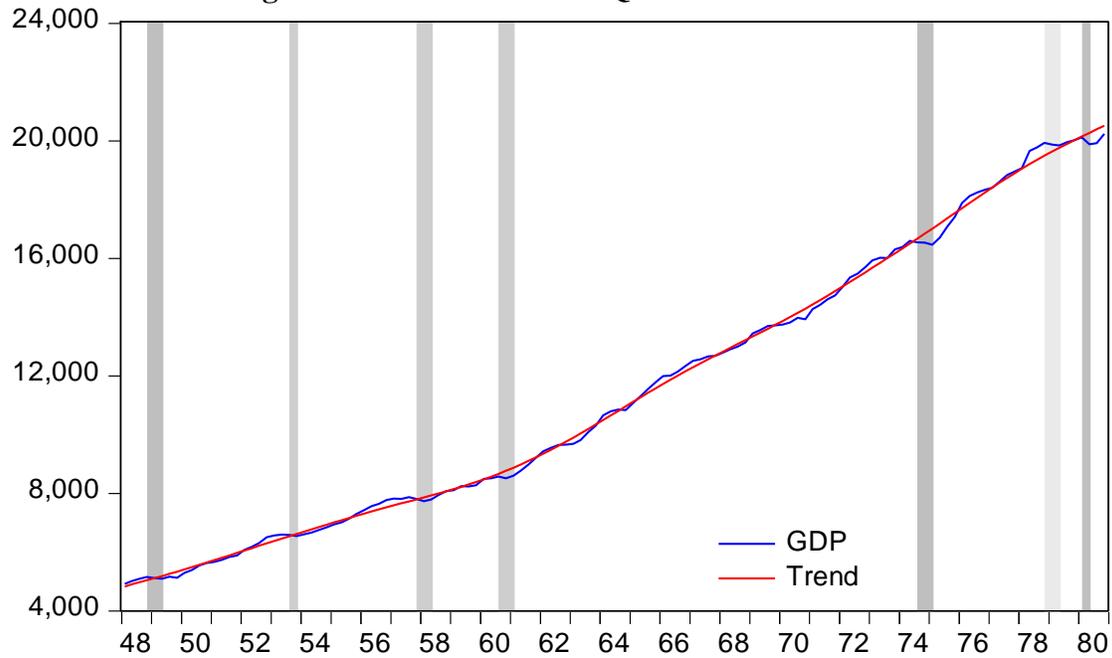
Source: Authors' calculation. Significant deflationary deviations are highlighted by the red circles.

Figure 2 shows that the declines of 1949, 1953, 1957, 1960 and 1975 were all sufficiently pronounced for a significant deflationary gap to appear. Each of these economic slowdowns can therefore, according to the two criteria we use, be qualified as recessions. The quarterly decline of 80Q2, although brief, was sufficiently strong (-0.8%, or -3.2% at an annualized rate) to qualify as a significant decline. Since this decline coincides with a significant deflationary gap, we qualify it as a recession.

But two episodes are trickier to qualify. First, let us consider the decline of the first half of 1979. Because of the vigorous growth in 1978, it was not until the end of 1979, after the GDP had resumed its growth, that a deflationary gap appeared. In contrast, GDP growth between 79Q3 and 80Q1 was so slow that the deflationary gap did not close until the brief recession of 80Q2 occurred. Can we consider the whole period 1979 and 1980 as a double-dip recession? The fact that the GDP in 80Q1 reached a higher peak than that observed before the decline in early 1979 prevents it from being regarded as such. In the end, we chose to mark the first two quarters of 1979 as a possible recession, distinct from that of 80Q2.

Like other researchers, we also had difficulty qualifying the period from 1969Q3 to 1970Q4. Growth was very slow for five consecutive quarters, and in 1970Q4 there was little or no growth at all, so that a deflationary gap as large as in other recessionary episodes widened. But since there is no quarterly decline in Quebec's real GDP, it is difficult to consider it a recession according to the first criterion of a recession. Finally, we thus retain seven episodes of recession in Quebec between 1948 and 1980, six of which we hold a firm opinion and a seventh, in 79Q1 and 79Q2, which we qualify as possible. They are 1949Q1 to 1949Q4, 1953Q4, 1957Q4 to 1958Q1, 1960Q4, 1975Q1, 1979Q1 to 1979Q2 (possible) and 1980Q2. Figure 3 marks these recessions in grey. Faced with the mixed judgement concerning 79T1 and 79T2 we mark this episode with a lighter grey.

Figure 3 : The real GDP of Quebec and its trend



In millions of dollars of 1980. Potential recessions are identified by shaded areas.

5. COMPARAISON WITH THE NORTH-AMERICAN BUSINESS CYCLE

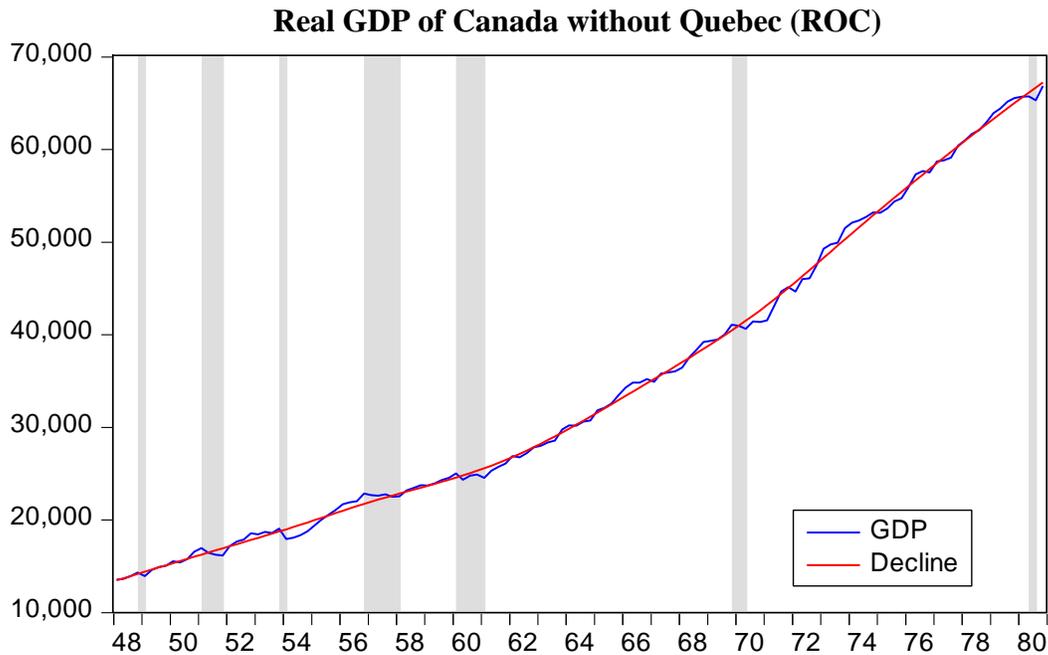
In this section, we compare the chronology of Quebec's business cycle with the Canadian cycle as published by Cross and Bergevin (2012) and the US cycle established by the NBER. To eliminate Quebec's contribution to Canada's business cycle, we calculated the real GDP of Canada without Quebec (called ROC for "Rest of Canada") to establish a chronology of recessions in the ROC based on the two criteria used for Quebec, namely a significant decline in GDP and a sizeable deviation of GDP from its trend level. This chronology is shown in the second column of Table 2, while ROC's real GDP is shown in Figure 4.

Table 2: Dates of recessions

Quebec (Authors)	ROC (Authors)	Canada (Cross and Bergevin)	United States (NBER)
1949Q1 to 1949Q4; Nil	1949Q1	Nil	1949Q1 to 1949Q4
1953Q4	1951Q2 to 1951Q4 1954Q1	1951Q2 to 1951Q4 1953Q3 to 1954Q2	Nil 1953Q4 to 1954Q2
1957Q4 to 1958Q1	1957Q1 to 1958Q1	1957Q2 to 1958Q1	1957Q4 to 1958Q2
1960Q4	1960Q2 to 1961Q1	1960Q2 to 1961Q1	1960Q3 to 1961Q1
Nil	1970Q1 to 1970Q2	Nil	1970Q1 to 1970Q4
1975Q1	Nil	1975Q1	1974Q1 to 1975Q1
1980Q2	1980Q3	1980Q1 to 1980Q2	1980Q2 to 1980Q3

Source: Cross and Bergevin (2012), NBER and authors' calculations.

Figure 4



In millions of dollars of 1980. Potential recessions are identified by shaded areas.

Does Quebec's business cycle coincide more with that of Canada or is it more correlated with the U.S. cycle? The major economic downturns occurred around the same time but affected the United States, Canada and Quebec to varying degrees. These slowdowns occurred in 1949, 1953-1954, 1957-1958, 1960-1961, 1970, 1974-1975 and 1980. However, there are some specificities that should be highlighted and we will look at them chronologically, focusing on the importance and dates of the periods of expansion and recession. The factors explaining recessions will be briefly recalled.

The recession that affected the United States throughout 1949 impacted Canada's GDP in the first quarter (-2.2 per cent), a decline too short-lived, however, to be described as a recession by Cross and Bergevin (2012). In Quebec, on the other hand, GDP fell in the first two quarters of 1949 (-0.7% and -0.1% respectively), thus meeting the usual criterion of duration of a recession. In the ROC, GDP decreased only in the first quarter (-2.7%). Since this decline is among the largest measured over the 40 years studied, it seems difficult not to qualify the episode as a brief recession, even if the criterion of duration is not met and the recovery in the second quarter was very strong (+4.8%). We have therefore chosen to include this date in the ROC chronology. Given the

importance of Canada's exports to the United States at the time, more than 65% (Linteau et al. 1989), the rise in raw material prices probably explains why Canada emerged from the recession faster than the United States. Recall that this increase was sufficient to push Canada out of the Bretton Woods agreements in 1950 and to allow its currency to float in order to limit the inflationary pressures that were growing in the country (Thiessen, 2001).

According to Cross and Bergevin (2012) a recession hit Canada between the 2nd and 4th quarter of 1951. Our results show, however, that Quebec, imitating here the United States, completely escaped this recession since Quebec's GDP grew during the last three quarters of 1951 (1.4%, 2.1% and 1.6% respectively). It was therefore only in the ROC that a marked decline in economic activity was observed during these three quarters (-2.9%, -1.4% and -0.4%).

The 1953-1954 recession, also noted by Linteau et al (1989), Hébert (1989) and Dauphin (2007), occurred when orders from companies supplying the military sector with raw materials and semi-finished products plummeted at the end of the Korean conflict. Cross and Bergevin (2012) set the start of the recession in Canada in 1953Q3 and its end in 1954Q2. Quebec, for its part, experienced only one quarterly decline in its real GDP in 1953Q4, bringing the cyclical peak to 1953Q3. Since this decline was small (-0.3%), it may seem difficult to describe it as a sharp and prolonged decline in GDP as usually observed in recessions. But because of the anemic growth of Quebec's real GDP in 1953Q2 and 1953Q3, which stands in contrast to the robust economic growth in the 1950s, this was sufficient to cause real GDP to depart significantly from its trend. The subsequent recovery, which began in 1954, was marked by a considerable increase in investment in Quebec's natural resource sector and in major infrastructure works, including the digging of the St. Lawrence Seaway and the construction of the Trans-Canada Highway (Hébert, 1989).

In the ROC, the erratic behavior of the real GDP is making it more difficult to pinpoint the date of the cyclical peak that preceded this recession. Indeed, the real GDP in the ROC fell in the 1st quarter of 1953 (-0.7%), before rising vigorously in the 2nd quarter (1.6%), then falling again in the 3rd quarter (-0.7%) before resuming a strong increase in the 4th quarter (2.5%). As the real GDP of the ROC was thus higher in the 4th quarter of 1953 than it was two quarters earlier, the peak was recorded in this quarter, just before the sharp drop in the GDP of the ROC in 1954Q1 (-

6.0%). We therefore include a brief but severe recession in this quarter, which occurs one quarter after Quebec.²

To help the economic recovery, the Bank of Canada adopted monetary stimulus measures in 1958 that lowered interest rates at the same time as expansionary fiscal measures were adopted by Canadian governments (Schembri, 2008). That recovery, however, was short-lived. Due to changes in the auto sector and an unduly rapid hike in U.S. interest rates in 1959, driven by the Fed's desire to avoid a resurgence of inflation (Romer and Romer, 2003), the U.S. slipped back into recession in 1960 (1960Q3 to 1961Q1). An equally restrictive monetary policy in Canada led the country into recession in the second quarter of that year (1960Q2 to 1961Q1), which led to a historic crisis between the government and the Bank of Canada, culminating in the premature end of Governor Coyne's term and Canada's return to the fixed exchange rate that it had abandoned 10 years earlier (Thiessen, 2001). In Quebec, the recession came later and lasted only two quarters (1960Q4 to 1961Q1).

The year 1961 marked the beginning of a long expansion that continued without interruption until the end of 1969. It gave way to a mild recession in the United States (1970Q1 to 1970Q4) that originated from the U.S. government's attempts to contain its deficit, swollen by the Vietnam War. However, this recession spared Canada as a whole according to Cross and Bergevin (2012). The same was true in Quebec, since the real GDP did not decline on a quarterly basis during this period, thus confirming the comments of Hébert (1989) and Linteau et al (1989), who describe the episode as an economic breathlessness. The ROC, on the other hand, was not as well preserved since its real GDP fell during the first two quarters of 1970 (-0.3% and -0.8% respectively). However, it emerged from recession two quarters earlier than in the United States.

The economies of the United States, Quebec and the ROC reacted differently to the first oil shock in 1973. This shock stemmed from the OPEC embargo imposed as a result of the Yom Kippur conflict, which caused the price of oil to quadruple from US\$2.89 to US\$11.56 per barrel (Hébert, 1989) and led to the bankruptcy of many energy-intensive firms in Quebec (Linteau et al. 1989).

² The jagged movements in the ROC's GDP are consistent with those for Canada as a whole, since Canada's real GDP in the fourth quarter of 1953 was 1.3 per cent higher than in the second quarter. Cross and Bergevin (2012) clearly considered other factors besides GDP to date the recession.

This embargo came on top of major weather disruptions (including El Nino) that greatly affected world harvests in 1972 (Blinder and Rudd, 2013) and caused a significant increase in food prices. Energy-consuming countries and net importers of agricultural products then experienced a marked deterioration in their terms of trade that lowered their real income. Macroeconomic management was further complicated by the need to adapt to flexible exchange rates following the ending of the Bretton Woods agreements in 1971 and the lack of a theoretical framework adapted to the stagflation situation that was taking root. The United States then experienced its longest and deepest recession in the post-war period (1974Q1 to 1975Q1), while Canada experienced only a brief recession in the first quarter of 1975.

Let us recall that the Canadian government adopted a policy of dual oil prices to limit the impact of the 1975 recession in the country (Hébert, 1989). This policy consisted, on the one hand, in selling exported crude oil at market prices and, on the other hand, in maintaining within Canada's borders an oil price that was up to 50% lower than the international market price. In Quebec, massive and timely public investments in construction, including the Olympic site (between 1974 and 1976) and the Mirabel airport (between 1974 and 1977), as well as subsidized housing programs (Operation 100,000 Homes in Montreal) helped limit the economic downturn (Dickinson and Young, 1992). The James Bay project, which began in 1971 and continued until the 1980s, also helped to boost economic activity.

Despite the magnitude of these expenditures, Quebec could not avoid the effects of the deterioration of its terms of trade and entered into a recession in the last quarter of 1974, a recession that ended in the first quarter of 1975. The importance of the energy and food sectors in the GDP undoubtedly allowed the ROC, unlike Quebec and the United States, to benefit from the improvement in the terms of trade observed in Canada at that time (Baldwin and Macdonald, 2012). This is, in all likelihood, what allowed the real GDP in the ROC to grow every quarter throughout 1974 and 1975, thus averting the recession.

The last recession identified was in 1980. It was preceded once again by a significant increase in oil prices that reached historic highs. While Canada as a whole was in recession in the first two

quarters of 1980 (Cross and Bergevin, 2012), the recession lasted only one quarter in Quebec (1980Q2) and in the rest of Canada, where it was delayed by one quarter (1980Q3).

This analysis shows the importance of regional business cycles in Canada and documents the fact that the business cycle is more closely linked to the manufacturing sector in Quebec while the rest of Canada's business cycle is more driven by natural resources. This is in line with observations made by Raynauld (1961) who pointed out that manufacturing production and construction contributed 78.4% of industrial production in Quebec compared to 68.3% for the rest of Canada (Raynauld, 1961). This most likely explains why Quebec's business cycle is closer to the American business cycle, which is also more industrial, than to that of the ROC. This greater similarity can be formally shown by the correlation between the GDP gap and its trend in the four territories studied. Because of the common North American component of the business cycle, all these correlations are of course positive. The correlation of the Quebec business cycle with that of Canada is 0.68, a fairly high level. But it is only 0.54 with the ROC, while it is 0.73 with the American cycle. We can also see that the degree of correlation of the ROC cycle reaches 0.98 with the Canadian cycle but is only 0.47 with the American cycle. These values imply that if deviations from the U.S. GDP trend were to be considered a unique exogenous source of GDP deviations in Canada, they would explain more than 50% of the deviations in Quebec GDP but less than 25% of those in the ROC.³

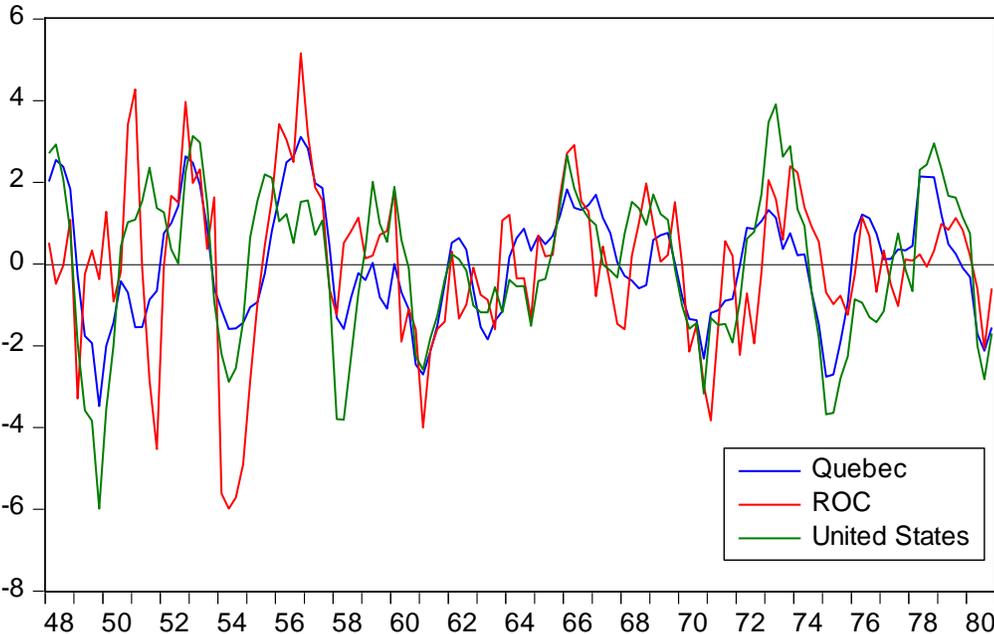
Table 3
Correlation of GDP deviations from its trend

	QUÉBEC	ROC	CANADA	ÉTATS-UNIS
QUÉBEC	1,00	0,54	0,68	0,73
ROC	0,54	1,00	0,98	0,47
CANADA	0,68	0,98	1,00	0,53
ÉTATS-UNIS	0,73	0,47	0,53	1,00

³ We refer here to the explanatory power of a regression with a single explanatory variable. We do not want to suggest that we should limit ourselves to a single factor or claim that US GDP is an exogenous shock, but simply to illustrate the consequences of the degree of correlation that we measure if it were to reflect the effect of exogenous variables.

In order to visualize the level of compliance with business cycles, Figure 5 presents the deviations of GDP from its trend used to compute the correlations presented in Table 3. It can be seen that it was mainly before 1955 and during the recessions that accompanied the two oil shocks that the ROC cycle moved further away from the US and Quebec cycles. Clearly, the episodes of the resource supercycle identified by Buyuksahin et al. (2016), whose peaks were in the early 1950s and 1970s, played an important role in these regional divergences.

Figure 5
Deviation of GDP from its trend



6. CONCLUSION

This study was designed to meet two objectives. The first was to construct a quarterly series of the GDP of the Quebec economy over the period from 1948 to 1980 consistent with the estimates of Quebec's real GDP that the Institut de la Statistique du Québec began publishing in 1980. The second was to identify the chronology of Quebec's business cycles in relation to that of the U.S. economy and that of the rest of Canada. To meet the first objective, we adopted the method of Ginsburgh (1973) as modified by De Carufel and Lizotte (1982). The advantage of using this method is that it

is also used by the ISQ. Unlike previous uses of this method, where a single variable is used to identify quarterly movement, we have identified three variables that contribute significantly to the construction of this frequency, namely employment in Quebec, retail sales in Quebec, and real GDP in the United States.

Our analysis of the duration and intensity of recessions confirms the presence of regionally differentiated cycles in Canada. The chronology we identify includes all the episodes of recession and expansion in Quebec identified in the studies by Hébert (1989), Linteau et al (1989), Raynauld (1961) or Vallières (1973) for the period 1948-1980. Finally, the comparison of the Quebec cycle with the ROC cycle derived from the Quebec estimates is quite consistent with the expected effects of the industrial structure of the two regions. An innovative aspect that results from our work is the highlighting, for the period studied, that the Quebec business cycle presents a greater similarity with the American business cycle than with the ROC.

Although the modified Ginsburgh method represents, in our view, the best that can be done given the available information, there are certain limitations inherent in the available data. For example, the GDP deflation index used to construct annual real GDP does not weight quantities according to the industrial structure of Quebec but according to that of Canada. Errors are likely to occur especially when the relative price of energy goods fluctuates significantly. Despite these limitations, the fact that we are able to reproduce the results for the period from 1981 to 2014 that are almost identical to those published by the ISQ reinforces the quality of our estimates and the fact that these results may be useful for analysts seeking to use quarterly GDP data for the pre-1980 period.

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APPENDIX 1 : Estimated real GDP of Quebec and the ROC (in millions of 1981 Canadian dollars)

	Canada	Quebec	ROC		Canada	Quebec	ROC
1948q1	18 383 \$	4 905 \$	13 478 \$	1964q3	41 419 \$	10 878 \$	30 541 \$
1948q2	18 578 \$	5 003 \$	13 575 \$	1964q4	41 644 \$	10 975 \$	30 669 \$
1948q3	18 936 \$	5 068 \$	13 868 \$	1965q1	42 923 \$	11 171 \$	31 752 \$
1948q4	19 371 \$	5 113 \$	14 258 \$	1965q2	43 342 \$	11 303 \$	32 039 \$
1949q1	18 945 \$	5 079 \$	13 866 \$	1965q3	43 979 \$	11 478 \$	32 501 \$
1949q2	19 608 \$	5 074 \$	14 534 \$	1965q4	45 115 \$	11 688 \$	33 427 \$
1949q3	19 988 \$	5 136 \$	14 852 \$	1966q1	46 148 \$	11 914 \$	34 234 \$
1949q4	20 106 \$	5 127 \$	14 979 \$	1966q2	46 775 \$	12 009 \$	34 766 \$
1950q1	20 741 \$	5 279 \$	15 462 \$	1966q3	46 906 \$	12 147 \$	34 759 \$
1950q2	20 741 \$	5 386 \$	15 355 \$	1966q4	47 434 \$	12 305 \$	35 129 \$
1950q3	21 218 \$	5 519 \$	15 699 \$	1967q1	47 333 \$	12 476 \$	34 857 \$
1950q4	22 084 \$	5 582 \$	16 502 \$	1967q2	48 283 \$	12 544 \$	35 739 \$
1951q1	22 490 \$	5 613 \$	16 877 \$	1967q3	48 493 \$	12 633 \$	35 860 \$
1951q2	22 086 \$	5 693 \$	16 393 \$	1967q4	48 643 \$	12 674 \$	35 969 \$
1951q3	21 977 \$	5 813 \$	16 164 \$	1968q1	49 139 \$	12 762 \$	36 377 \$
1951q4	22 009 \$	5 908 \$	16 101 \$	1968q2	50 392 \$	12 877 \$	37 515 \$
1952q1	23 159 \$	6 075 \$	17 084 \$	1968q3	51 272 \$	12 981 \$	38 291 \$
1952q2	23 780 \$	6 173 \$	17 607 \$	1968q4	52 269 \$	13 119 \$	39 150 \$
1952q3	24 093 \$	6 283 \$	17 810 \$	1969q1	52 651 \$	13 395 \$	39 256 \$
1952q4	24 919 \$	6 442 \$	18 477 \$	1969q2	52 937 \$	13 542 \$	39 395 \$
1953q1	24 871 \$	6 515 \$	18 356 \$	1969q3	53 646 \$	13 681 \$	39 965 \$
1953q2	25 211 \$	6 563 \$	18 648 \$	1969q4	54 712 \$	13 713 \$	40 999 \$
1953q3	25 095 \$	6 575 \$	18 520 \$	1970q1	54 626 \$	13 733 \$	40 893 \$
1953q4	25 545 \$	6 557 \$	18 988 \$	1970q2	54 350 \$	13 791 \$	40 559 \$
1954q1	24 456 \$	6 600 \$	17 856 \$	1970q3	55 294 \$	13 925 \$	41 369 \$
1954q2	24 655 \$	6 646 \$	18 009 \$	1970q4	55 228 \$	13 930 \$	41 298 \$
1954q3	25 014 \$	6 723 \$	18 291 \$	1971q1	55 721 \$	14 233 \$	41 488 \$
1954q4	25 495 \$	6 809 \$	18 686 \$	1971q2	57 449 \$	14 388 \$	43 061 \$
1955q1	26 243 \$	6 911 \$	19 332 \$	1971q3	59 171 \$	14 573 \$	44 598 \$
1955q2	26 962 \$	6 996 \$	19 966 \$	1971q4	59 796 \$	14 731 \$	45 065 \$
1955q3	27 629 \$	7 121 \$	20 508 \$	1972q1	59 605 \$	15 010 \$	44 595 \$
1955q4	28 270 \$	7 271 \$	20 999 \$	1972q2	61 232 \$	15 307 \$	45 925 \$
1956q1	29 049 \$	7 405 \$	21 644 \$	1972q3	61 466 \$	15 464 \$	46 002 \$
1956q2	29 366 \$	7 542 \$	21 824 \$	1972q4	63 138 \$	15 657 \$	47 481 \$
1956q3	29 584 \$	7 625 \$	21 959 \$	1973q1	65 090 \$	15 862 \$	49 228 \$
1956q4	30 515 \$	7 733 \$	22 782 \$	1973q2	65 679 \$	15 997 \$	49 682 \$
1957q1	30 377 \$	7 782 \$	22 595 \$	1973q3	65 901 \$	16 039 \$	49 862 \$
1957q2	30 325 \$	7 787 \$	22 538 \$	1973q4	67 699 \$	16 267 \$	51 432 \$
1957q3	30 540 \$	7 846 \$	22 694 \$	1974q1	68 372 \$	16 345 \$	52 027 \$
1957q4	30 229 \$	7 804 \$	22 425 \$	1974q2	68 768 \$	16 516 \$	52 252 \$
1958q1	30 226 \$	7 733 \$	22 493 \$	1974q3	69 184 \$	16 528 \$	52 656 \$

1958q2	30 885 \$	7 779 \$	23 106 \$	1974q4	69 682 \$	16 567 \$	53 115 \$
1958q3	31 294 \$	7 908 \$	23 386 \$	1975q1	69 608 \$	16 518 \$	53 090 \$
1958q4	31 703 \$	8 028 \$	23 675 \$	1975q2	70 262 \$	16 697 \$	53 565 \$
1959q1	31 742 \$	8 088 \$	23 654 \$	1975q3	71 307 \$	17 005 \$	54 302 \$
1959q2	32 084 \$	8 200 \$	23 884 \$	1975q4	72 010 \$	17 344 \$	54 666 \$
1959q3	32 433 \$	8 210 \$	24 223 \$	1976q1	73 656 \$	17 817 \$	55 839 \$
1959q4	32 739 \$	8 270 \$	24 469 \$	1976q2	75 336 \$	18 081 \$	57 255 \$
1960q1	33 392 \$	8 450 \$	24 942 \$	1976q3	75 854 \$	18 241 \$	57 613 \$
1960q2	32 750 \$	8 483 \$	24 267 \$	1976q4	75 792 \$	18 349 \$	57 443 \$
1960q3	33 250 \$	8 544 \$	24 706 \$	1977q1	77 051 \$	18 404 \$	58 647 \$
1960q4	33 360 \$	8 526 \$	24 834 \$	1977q2	77 340 \$	18 573 \$	58 767 \$
1961q1	33 096 \$	8 610 \$	24 486 \$	1977q3	77 836 \$	18 780 \$	59 056 \$
1961q2	34 019 \$	8 770 \$	25 249 \$	1977q4	79 277 \$	18 936 \$	60 341 \$
1961q3	34 616 \$	8 942 \$	25 674 \$	1978q1	80 043 \$	19 115 \$	60 928 \$
1961q4	35 183 \$	9 156 \$	26 027 \$	1978q2	81 209 \$	19 593 \$	61 616 \$
1962q1	36 183 \$	9 376 \$	26 807 \$	1978q3	81 760 \$	19 740 \$	62 020 \$
1962q2	36 223 \$	9 520 \$	26 703 \$	1978q4	82 739 \$	19 884 \$	62 855 \$
1962q3	36 775 \$	9 629 \$	27 146 \$	1979q1	83 700 \$	19 847 \$	63 853 \$
1962q4	37 433 \$	9 673 \$	27 760 \$	1979q2	84 177 \$	19 836 \$	64 341 \$
1963q1	37 676 \$	9 724 \$	27 952 \$	1979q3	85 024 \$	19 921 \$	65 103 \$
1963q2	38 142 \$	9 838 \$	28 304 \$	1979q4	85 461 \$	19 978 \$	65 483 \$
1963q3	38 523 \$	10 030 \$	28 493 \$	1980q1	85 694 \$	20 058 \$	65 636 \$
1963q4	39 883 \$	10 204 \$	29 679 \$	1980q2	85 566 \$	19 900 \$	65 666 \$
1964q1	40 637 \$	10 493 \$	30 144 \$	1980q3	85 179 \$	19 937 \$	65 242 \$
1964q2	40 804 \$	10 698 \$	30 106 \$	1980q4	86 945 \$	20 172 \$	66 773 \$

Source : Statistics Canada table 36-10-0137-01 and authors' calculations. Canadian GDP was multiplied by 0.202 to express it in constant 1981 dollars.

Appendix 2: Rate of change in Quebec's real GDP and ROC

	Canada	Quebec	ROC		Canada	Quebec	ROC
1948q1				1964q3	1.5%	1.7%	1.4%
1948q2	1.1%	2.0%	0.7%	1964q4	0.5%	0.9%	0.4%
1948q3	1.9%	1.3%	2.2%	1965q1	3.1%	1.8%	3.5%
1948q4	2.3%	0.9%	2.8%	1965q2	1.0%	1.2%	0.9%
1949q1	-2.2%	-0.7%	-2.7%	1965q3	1.5%	1.6%	1.4%
1949q2	3.5%	-0.1%	4.8%	1965q4	2.6%	1.8%	2.8%
1949q3	1.9%	1.2%	2.2%	1966q1	2.3%	1.9%	2.4%
1949q4	0.6%	-0.2%	0.9%	1966q2	1.4%	0.8%	1.6%
1950q1	3.2%	3.0%	3.2%	1966q3	0.3%	1.2%	0.0%
1950q2	0.0%	2.0%	-0.7%	1966q4	1.1%	1.3%	1.1%
1950q3	2.3%	2.5%	2.2%	1967q1	-0.2%	1.4%	-0.8%
1950q4	4.1%	1.1%	5.1%	1967q2	2.0%	0.5%	2.5%
1951q1	1.8%	0.6%	2.3%	1967q3	0.4%	0.7%	0.3%
1951q2	-1.8%	1.4%	-2.9%	1967q4	0.3%	0.3%	0.3%
1951q3	-0.5%	2.1%	-1.4%	1968q1	1.0%	0.7%	1.1%
1951q4	0.1%	1.6%	-0.4%	1968q2	2.5%	0.9%	3.1%
1952q1	5.2%	2.8%	6.1%	1968q3	1.7%	0.8%	2.1%
1952q2	2.7%	1.6%	3.1%	1968q4	1.9%	1.1%	2.2%
1952q3	1.3%	1.8%	1.2%	1969q1	0.7%	2.1%	0.3%
1952q4	3.4%	2.5%	3.7%	1969q2	0.5%	1.1%	0.4%
1953q1	-0.2%	1.1%	-0.7%	1969q3	1.3%	1.0%	1.4%
1953q2	1.4%	0.7%	1.6%	1969q4	2.0%	0.2%	2.6%
1953q3	-0.5%	0.2%	-0.7%	1970q1	-0.2%	0.1%	-0.3%
1953q4	1.8%	-0.3%	2.5%	1970q2	-0.5%	0.4%	-0.8%
1954q1	-4.3%	0.7%	-6.0%	1970q3	1.7%	1.0%	2.0%
1954q2	0.8%	0.7%	0.9%	1970q4	-0.1%	0.0%	-0.2%
1954q3	1.5%	1.2%	1.6%	1971q1	0.9%	2.2%	0.5%
1954q4	1.9%	1.3%	2.2%	1971q2	3.1%	1.1%	3.8%
1955q1	2.9%	1.5%	3.5%	1971q3	3.0%	1.3%	3.6%
1955q2	2.7%	1.2%	3.3%	1971q4	1.1%	1.1%	1.0%
1955q3	2.5%	1.8%	2.7%	1972q1	-0.3%	1.9%	-1.0%
1955q4	2.3%	2.1%	2.4%	1972q2	2.7%	2.0%	3.0%
1956q1	2.8%	1.8%	3.1%	1972q3	0.4%	1.0%	0.2%
1956q2	1.1%	1.9%	0.8%	1972q4	2.7%	1.2%	3.2%
1956q3	0.7%	1.1%	0.6%	1973q1	3.1%	1.3%	3.7%
1956q4	3.1%	1.4%	3.7%	1973q2	0.9%	0.9%	0.9%
1957q1	-0.5%	0.6%	-0.8%	1973q3	0.3%	0.3%	0.4%
1957q2	-0.2%	0.1%	-0.2%	1973q4	2.7%	1.4%	3.1%
1957q3	0.7%	0.8%	0.7%	1974q1	1.0%	0.5%	1.2%
1957q4	-1.0%	-0.5%	-1.2%	1974q2	0.6%	1.0%	0.4%
1958q1	0.0%	-0.9%	0.3%	1974q3	0.6%	0.1%	0.8%
1958q2	2.2%	0.6%	2.7%	1974q4	0.7%	0.2%	0.9%
1958q3	1.3%	1.7%	1.2%	1975q1	-0.1%	-0.3%	0.0%

1958q4	1.3%	1.5%	1.2%	1975q2	0.9%	1.1%	0.9%
1959q1	0.1%	0.8%	-0.1%	1975q3	1.5%	1.8%	1.4%
1959q2	1.1%	1.4%	1.0%	1975q4	1.0%	2.0%	0.7%
1959q3	1.1%	0.1%	1.4%	1976q1	2.3%	2.7%	2.1%
1959q4	0.9%	0.7%	1.0%	1976q2	2.3%	1.5%	2.5%
1960q1	2.0%	2.2%	1.9%	1976q3	0.7%	0.9%	0.6%
1960q2	-1.9%	0.4%	-2.7%	1976q4	-0.1%	0.6%	-0.3%
1960q3	1.5%	0.7%	1.8%	1977q1	1.7%	0.3%	2.1%
1960q4	0.3%	-0.2%	0.5%	1977q2	0.4%	0.9%	0.2%
1961q1	-0.8%	1.0%	-1.4%	1977q3	0.6%	1.1%	0.5%
1961q2	2.8%	1.9%	3.1%	1977q4	1.9%	0.8%	2.2%
1961q3	1.8%	2.0%	1.7%	1978q1	1.0%	0.9%	1.0%
1961q4	1.6%	2.4%	1.4%	1978q2	1.5%	2.5%	1.1%
1962q1	2.8%	2.4%	3.0%	1978q3	0.7%	0.7%	0.7%
1962q2	0.1%	1.5%	-0.4%	1978q4	1.2%	0.7%	1.3%
1962q3	1.5%	1.1%	1.7%	1979q1	1.2%	-0.2%	1.6%
1962q4	1.8%	0.5%	2.3%	1979q2	0.6%	-0.1%	0.8%
1963q1	0.6%	0.5%	0.7%	1979q3	1.0%	0.4%	1.2%
1963q2	1.2%	1.2%	1.3%	1979q4	0.5%	0.3%	0.6%
1963q3	1.0%	2.0%	0.7%	1980q1	0.3%	0.4%	0.2%
1963q4	3.5%	1.7%	4.2%	1980q2	-0.1%	-0.8%	0.0%
1964q1	1.9%	2.8%	1.6%	1980q3	-0.5%	0.2%	-0.6%
1964q2	0.4%	1.9%	-0.1%	1980q4	2.1%	1.2%	2.3%

Source : Statistics Canada table 36-10-0137-01 and authors' calculations.