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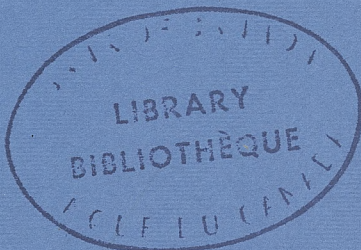
**Recession Period Performance  
of Prices: 1914 to 1950**

by P. Ferley and A. Dunnigan

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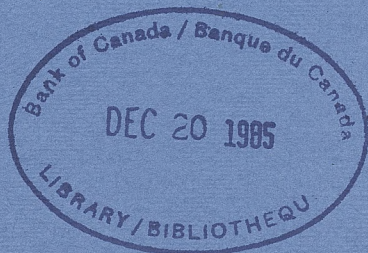
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## RECESSION PERIOD PERFORMANCE OF PRICES: 1914 TO 1950

### Introduction and Summary

This paper is an extension of the analysis conducted in Working Paper 5 (Paul Ferley and Brian O'Reilly assisted by Anne Dunnigan), which considered the post-1950 cyclical performance of prices. This paper lengthens the period of analysis back to 1914 using a smaller set of price series. The starting point in the earlier paper was chosen for two reasons: The dates of the business cycle used were those established by Statistics Canada [1] and covered only the post-1950 period; and it was desirable to use as large a number of price series as possible to represent products that varied by levels of processing, exposure to competition, domestic and foreign origin, and government regulation. To attain the latter it was practical to start the analysis only in the 1950s. The first problem is not necessarily insurmountable. Business cycle dates are available for the period 1873 to 1961 in a study done by White [6] for the Economic Council of Canada. The business cycles identified by White for the period from 1914 to 1950 are shown in Table 1. The method used for the dating of the cycle in the

Table 1

#### Business Cycles in Canada 1914 to 1950\*

| <u>Peak</u> | <u>Trough</u> |
|-------------|---------------|
| Jan. 1918   | Apr. 1919     |
| June 1920   | Sept. 1921    |
| June 1923   | Aug. 1924     |
| Apr. 1929   | Mar. 1933     |
| July 1937   | Oct. 1938     |
| -           | Feb. 1946     |
| Oct. 1948   | Sept. 1949    |

\* Source: Derek A. White, Business Cycles in Canada, Staff Study No. 17 prepared for the Economic Council of Canada, Ottawa: Queen's Printer, 1967.

White study is different from the method used by Statistics Canada; the former used a wide range of economic variables including production, construction work, merchandising and profits to date the cycle, whereas Statistics Canada used a more narrow range related to economic production only. A comparison of the overlap period shows that the Statistics Canada approach identifies a recession not included in the White study (June 1951-December 1951) and a slightly different dating of two other recessions. (Statistics Canada identifies a February 1957-January 1958 as

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*This paper is one of the series of working papers for "Price Flexibility and Business Cycle Fluctuations in Canada - A Survey", a study prepared by the Research Department of the Bank of Canada for the Royal Commission on the Economic Union and Development Prospects for Canada. These research papers were all completed in early 1984.*

well as an April 1960-January 1961 recession, whereas the White study identifies comparable recessions as May 1957-April 1958 and February 1960-March 1961.) For the analysis in this paper the dates established by White were used. The second problem was avoided by simply waiving it and replacing it with the criterion that the price indices used must have long historical series. Of the major price series used in the Ferley-O'Reilly working paper, two are available further back in time than 1950 with limited disaggregation: the CPI (or as it was called in the earlier period, Cost-of-Living Index (COL)) which is available back to 1914 and the WPI which is available back to 1913.<sup>1</sup>

This present note considers the recession-period performance of prices from 1914 to 1950. Though it is an extension of the Ferley-O'Reilly paper it should be stressed that the methodology used for the dating of the business cycles is different and that the analysis is conducted on a much smaller number of price series. The principal conclusion of the paper is that though an initial consideration of the measure of recession-period sensitivity might indicate a trend towards decreased sensitivity this impression could be misleading with respect to the CPI for two reasons: the nature of some of the recessions in the pre-1950 period may have biased the results; and the problems associated with using weighted price series, namely, that trends in cyclical sensitivity may be due to weight shifts or coverage within the index, becomes more acute when we add the pre-1950 period on to the post-1950 results.

A further caveat is that each of the Cagan and Sachs approaches suffers from certain shortcomings. Neither one controls for the severity of individual business cycles. In addition, a common deficiency is that identification of increased "flexibility" or "rigidity" of price response relies heavily upon the judgement of the researcher and not upon replicable objective tests.

The first section of the paper attempts to give a broad characterization of the state of the economy with reference to the business cycles identified in Table 1. Mention is also given to trends in prices and economic policy at the time. The characterization of this period draws heavily upon the two royal commission reports from that era: the Royal Commission on Dominion-Provincial Relations (the Rowell-Sirois Report) [3] and the Royal Commission on Canada's Economic Prospects (the Gordon Report) [5]. The second section of the paper considers the recession-period responsiveness of prices in a similar manner to that conducted in the Ferley-O'Reilly paper.

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1. The WPI has been compiled since 1890 but monthly data were found only as far back as January 1913.

## A Brief Outline of the Performance of the Canadian Economy 1914 to 1950

The expansion which peaked in January 1918 identified in Table 1 reflects the increased demand for Canadian products, particularly raw materials, that occurred during World War I. The Canadian Prairies had just been opened up for the production of wheat when the outbreak of war sharply increased the demand for foodstuffs. Wheat prices jumped 98.2% between 1915 and 1918. This increase resulted in rapid increases in land brought under production. Non-ferrous metal prices jumped 32.7% over the same period and though this increase was not as large as that experienced in wheat it was sufficient to prompt increased metal production as well. These price rises were aided over the war period by a rapid expansion of credit both in Canada and abroad. The February 1918-April 1919 recession period identified by White likely reflects the fact that fighting was terminated in November 1918 and the decline in economic activity was induced by the attendant reduction of spending for military purposes. However the Rowell-Sirois Report suggests that federal government expenditure did not decline substantially until mid-1920 because of the costs involved in "demobilization and soldiers' civil re-establishment". As well, provincial and municipal governments undertook projects that had been earlier deferred. Bank credit was still readily available and prices continued to rise until mid-1920. Thus it would seem that the February 1918-April 1919 recession identified by White was relatively mild and that in many ways the economic boom induced by World War I lasted until mid-1920. The July 1920-September 1921 recession was a much more definite decline in economic activity both in Canada and the world. Though there had been continuing economic growth immediately following World War I, by the summer of 1920 international factors such as overexpanded heavy industries, extreme disruption of exchange markets, and unbalanced budgets by many countries, resulted in a sizeable decline in the world economy. The decline prompted a sharp drop in a number of raw material prices which had enjoyed equally sharp price increases during the war boom. The Rowell-Sirois Report places considerable emphasis on the drop in wheat prices which fell 34.9% between 1920 and 1921. The Report states that "the decline in the purchasing power of Western agriculture, combined with rigid costs, brought a sharp curtailment of demand for manufactures from Central Canada. Considerable unemployment emerged in industrial centres."<sup>2</sup> The interesting point raised by this quote is that it suggests that a fall in raw material prices, wheat in particular, prompted the decline in the Canadian economy. The Rowell-Sirois Report suggests that the Canadian economy following this recession began to expand over most of the decade with no indication of the July 1923-August 1924 recession identified by White. Though commodity prices did not rise

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2. Report of the Royal Commission on Dominion-Provincial Relations Book 1, by Joseph Sirois, Chairman. Ottawa: King's Printer, 1940, p. 114.

spectacularly over the decade they did rise sufficiently to make production of most items profitable. Increased production of raw materials did not play as large a role in the growth experienced in the 1920s as it did in the February 1915-January 1918 expansion. Rather, additional growth in the 1920s came from an investment boom directed towards developing these natural resources, particularly in British Columbia and the northern areas of Ontario and Quebec. This investment boom was brought to an end with the collapse of a number of raw material prices in 1930. The collapse was viewed as a consequence of a growing trend by many producing nations of protecting uneconomic production of raw materials and the general loss of confidence in the world economy prompted by the collapse of the stock markets in the United States. The May 1929-March 1933 recession in Canada was once again attributed in the Rowell-Sirois Report to this decline in raw material prices. "It was the sharp fall in export prices which pushed Canada down the incline of depression. The level of export values was directly the basis of the income of a large section of the economy; it determined the incentives for capital investment and the size of the market for the protected manufacturing industry. When these values shrank, the repercussions were widespread."<sup>3</sup> Again, as in the July 1920-September 1921 recession, the Report seems to be attributing the decline in economic activity to a decline in a number of raw material prices.

The Gordon Report characterizes the period following the May 1929-March 1933 recession as one of convalescence from this economic downturn. The Report suggests that this recovery continued until 1939 with no mention of the August 1937-October 1938 recession identified by White. The year 1939 did not mark a downturn in the recovery but rather an acceleration brought about by the outbreak of World War II. Like World War I, World War II also prompted a marked increase in economic activity in Canada. The difference was that in World War I increased activity occurred in the natural resource and primary manufacturing sectors whereas in World War II the increased activity was in secondary manufacturing. World War II did have an impact on the resource sector but it was generally one of altering the output mix (i.e., a shift in production from gold to zinc) which on balance resulted in little change in total output. The trough in February 1946 identified by White was brought about by the cessation of defence expenditures with the end of World War II in Europe in May 1945 and in the Far East in August 1945. The downturn that occurred was not severe with the newly expanded manufacturing sector seeming to adapt to supplying a peacetime economy. Rigid price controls had been in effect from 1941 to 1945, keeping the average annual rate of

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3. Report of the Royal Commission on Dominion-Provincial Relations, p. 144.

inflation on a CPI basis low. However with the end of hostilities decontrol commenced. This period of decontrol was essentially completed by the end of 1948 in Canada. (Decontrol was completed by mid-1946 in the United States.) The combination of the removal of price controls and an expanding economy in the post-World War II period sent retail prices higher, with the Consumer Price Index rising on an annual average basis 9.4% in 1947 and 14.4% in 1948. These increases compare with rises of 0.5% in 1945 and 3.3% in 1946. The sudden jump in the inflation rate prompted a number of actions in 1948, including a tighter fiscal policy introduced in the May 1948 federal government budget and the re-introduction of price controls particularly on food. The measures were in part successful in bringing the inflation rate down to 3.1% in 1949. The post-World War II boom came to an end with the November 1948-September 1949 recession.

#### **Recession-Period Performance of Prices 1914 to 1950**

This section of the paper considers the recession-period performance of the WPI and the CPI in the pre-1950 period and compares it with the post-1950 period. The measure that is used to gauge performance is the difference between the annualized rate of inflation during the recession and expansion phases of each business cycle. Inflation during the expansion was calculated in the same manner as that used by Sachs [4] and was determined as the rate of change of prices between the peak and one year prior to the peak while inflation at the trough was the annualized rate of change of prices between the trough and the previous peak. The results for the pre-1950 period using unadjusted data are shown in Table 2. Also shown in Table 2 are comparable data for the post-1950 period taken from the Ferley-O'Reilly working paper.

The calculated measures for the pre-1950 period shown in Table 2 are always negative. This seems to suggest that downturns in the economy were successful in lowering the trend rate of inflation. There does not appear to be any trend toward increased or decreased sensitivity over the pre-1950 period for either the WPI or CPI series. A consideration of the WPI over both periods possibly shows a slight decrease in the responsiveness of prices given that there were two recessions in the later period where the calculated measure was positive. But the trend does not seem that strong, given the very marked fall in the WPI in the June 1974-March 1975 recession. A consideration of the CPI would seem to indicate a very definite trend toward decreased sensitivity. In the pre-1950 period downturns in the economy always managed to reduce the trend inflation of the previous expansion, whereas in the post-1950 period recessions achieved a reduction only in the first and last economic downturns. Thus an initial consideration of the calculated measure for the CPI might suggest that there has been a trend toward decreased

Table 2

## Annual Rate of Change Over Post-World War I Recession Periods

| Reference cycles: |            | Consumer<br>Price Index (unadjusted) |                   |                       | Wholesale<br>Price Index (unadjusted) |                   |                       |
|-------------------|------------|--------------------------------------|-------------------|-----------------------|---------------------------------------|-------------------|-----------------------|
| Peak              | Trough     | Expansion                            | Recession         | Rec.<br>minus<br>Exp. | Expansion                             | Recession         | Rec.<br>minus<br>Exp. |
| 1918:Jan.         | 1919:Apr.  | 14.4                                 | 9.9               | -4.5                  | 22.1                                  | 3.9               | -18.2                 |
| 1920:June         | 1921:Sept. | 19.1                                 | -12.6             | -31.7                 | 26.8                                  | -31.0             | -57.8                 |
| 1923:June         | 1924:Aug.  | 0.4                                  | -1.4              | -1.8                  | 1.1                                   | -0.3              | -1.4                  |
| 1929:Apr.         | 1933:Mar.  | 0.5                                  | -5.9 <sup>1</sup> | -6.4                  | -3.6                                  | -9.1 <sup>1</sup> | -5.5                  |
| 1937:July         | 1938:Oct.  | 3.7                                  | 0.2               | -3.5                  | 15.8                                  | -11.2             | -27.0                 |
| -                 | 1946:Feb.  |                                      |                   |                       |                                       |                   |                       |
| 1948:Oct.         | 1949:Sept. | 12.4                                 | 0.8               | -11.6                 | 15.7                                  | -2.5              | -18.2                 |
| 1951:May          | 1951:Dec.  | 11.3                                 | 8.2               | -3.1                  | 18.0                                  | -3.2              | -21.2                 |
| 1953:May          | 1954:June  | -1.4                                 | 1.0               | 2.4                   | -1.8                                  | -1.1              | 0.7                   |
| 1957:Jan.         | 1958:Jan.  | 3.1                                  | 2.4               | -0.7                  | 3.0                                   | -0.7              | -3.7                  |
| 1960:Mar.         | 1961:Jan.  | 1.6                                  | 1.9               | 0.3                   | -0.2                                  | 0.5               | 0.7                   |
| 1974:May          | 1975:Mar.  | 10.6                                 | 10.7              | 0.1                   | 25.6                                  | 7.3               | -18.3                 |
| 1979:Oct.         | 1980:June  | 9.5                                  | 10.5              | 1.0                   | n.a.                                  | n.a.              | n.a.                  |
| 1981:June         | 1982:Dec.  | 12.7                                 | 9.6               | -3.1                  | n.a.                                  | n.a.              | n.a.                  |

n.a.: not available

1. The trend rate of inflation for the April 1929-March 1933 recession is calculated over approximately four years versus an average of one year for the other recessions.



cyclical sensitivity of prices since World War I. However there are two main objections that can be raised against this conclusion: the nature of the cycles may tend to bias the results; and the basic problem of using weighted price index data, namely, that trends in cyclical sensitivity may be attributable to weight shifts or coverage within the index, becomes more acute the longer the period considered. These two objections are discussed in detail below.

One of the basic intents of calculating the measures in Table 2 is to determine the extent to which downturns in the economy were (or were not) successful in lowering the trend inflation of the previous expansion. However, for the July 1920-September 1921 and the May 1929-May 1933 recessions the Rowell-Sirois Report suggests that it was in fact a fall in prices that prompted the recession. Admittedly, the Report was referring to raw materials prices but these price movements would still have an effect on the CPI principally through food and clothing components particularly in this earlier period. The interpretation that a fall in prices prompted the recession in Canada reverses the causality from that posited in view of the original intent for calculating the measure. This problem of distinguishing between supply side and demand side shocks is a problem that is equally applicable to the post-1950 period when considering the May 1974-March 1975 and October 1979-June 1980 recessions. A second point regarding bias can be made with respect to the November 1948-September 1949 recession. The trend rate of inflation over the expansion was calculated from October 1947 to October 1948. This coincides with the period in which price controls invoked during World War II were being lifted in Canada. This would likely bias upward the calculated inflation rate during the expansion, as an element of a "post-control bubble" may have been occurring. As well the trend rate of inflation over the recession was calculated from October 1948 to September 1949 which coincided with a period in which price controls were re-invoked for food because of the rapid increase this component had shown in the previous expansion period. Both of these effects would tend to bias downward the calculated measure.

The second objection raised was that by using weighted price indices cyclical sensitivity may be attributable to weight shifts or coverage within the index. As Table 2 suggests raw materials prices tend to be more cyclically sensitive than prices of more highly processed goods. Thus if prices for less-processed goods have a declining weight in the CPI over time then, ceteris paribus, the CPI will show a trend toward decreased cyclical sensitivity. Food is one component of the CPI that includes a number of items that have limited processing. Its expenditure weight in the total CPI has declined from about 1/3 in 1937-38 to about 1/5 at present. Even within the food component the share of more processed foods has increased over time reinforcing the above trend. In order to check this, a CPI ex food price series was constructed. This



series was never officially published but it is possible to construct an approximation for it because the CPI food series is available monthly back to January 1914. Implicit weights are not available at any point over the pre-1950 period and expenditure weights are available only back to 1937-38. The heroic assumption was made that this expenditure weight was constant back to 1914 and was a close approximation to the implicit weight. It is mainly because of this assumption that the constructed series should be viewed as an approximation only. The CPI ex food series was calculated as a weighted subtraction of the food index (seasonally adjusted) from the total CPI (seasonally adjusted). Seasonally adjusted data were used to make it compatible with Table 6 in the Ferley-O'Reilly working paper. Table 3 shows the calculated measure using both the total CPI and CPI ex food. The data for the post-1950 period are a duplication of the results from the earlier paper. The food component contributed to making the total CPI more cyclically sensitive for all but one recession in the pre-1950 period. There still appears to be a trend toward decreased cyclical sensitivity using the measure calculated for CPI ex food, though it is much less marked than the trend for the total CPI.

In conclusion, although a consideration of the calculated measure in the pre-1950 period in addition to the post-1950 period for the CPI and WPI initially suggests that there has been a trend toward decreased cyclical sensitivity, this impression may be misleading with respect to the CPI for two reasons: the nature of some of the recessions in the pre-1950 period may have biased the results; and the problems associated with using weighted price series becomes more acute when we add the pre-1950 period on to the post-1950 results.



**Table 3**

**Annual Rate of Change Over Post-World War I Recession Periods**

| <u>Reference cycles:</u> |               | <u>CPI (seasonally adjusted)</u> |                  |                                | <u>CPI ex. food (seasonally adjusted)</u> |                  |                                |
|--------------------------|---------------|----------------------------------|------------------|--------------------------------|---|------------------|--------------------------------|
| <u>Peak</u>              | <u>Trough</u> | <u>Expansion</u>                 | <u>Recession</u> | <u>Rec.<br/>minus<br/>Exp.</u> | <u>Expansion</u>                          | <u>Recession</u> | <u>Rec.<br/>minus<br/>Exp.</u> |
| 1918:Jan.                | 1919:Apr.     | 14.4                             | 10.1             | -4.3                           | 9.7                                       | 12.1             | 2.4                            |
| 1920:June                | 1921:Sept.    | 19.4                             | -12.8            | -32.2                          | 16.8                                      | -3.3             | -20.1                          |
| 1923:June                | 1924:Aug.     | 0.5                              | -1.6             | -2.1                           | 1.1                                       | -4.1             | -5.2                           |
| 1929:Apr.                | 1933:Mar.     | 0.6                              | -5.9             | -6.5                           | -1.4                                      | -3.9             | -2.5                           |
| 1937:July                | 1938:Oct.     | 3.7                              | -0.3             | -4.0                           | 2.2                                       | 0.8              | -1.4                           |
| -                        | 1946:Feb.     |                                  |                  |                                |   |                  |                                |
| 1948:Oct.                | 1949:Sept.    | 12.4                             | 1.0              | -11.4                          | 7.5                                       | 2.2              | -5.3                           |
| 1951:May                 | 1951:Dec.     | 10.8                             | 7.5              | -3.3                           | 9.1                                       | 6.6              | -2.5                           |
| 1953:May                 | 1954:June     | -1.4                             | 1.0              | 2.4                            | 0.3                                       | 1.2              | 0.9                            |
| 1957:Jan.                | 1958:Jan.     | 3.1                              | 2.4              | -0.7                           | 1.9                                       | 2.9              | 1.0                            |
| 1960:Mar.                | 1961:Jan.     | 1.3                              | 1.5              | 0.2                            | 1.8                                       | 0.7              | -1.1                           |
| 1974:May                 | 1975:Mar.     | 10.9                             | 10.7             | -0.2                           | 8.5                                       | 10.0             | 1.5                            |
| 1979:Oct.                | 1980:June     | 9.5                              | 9.9              | 0.4                            | 8.5                                       | 10.3             | 1.8                            |
| 1981:June                | 1982:Dec.     | 12.8                             | 9.9              | -2.9                           | 12.7                                      | 11.5             | -1.2                           |





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