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Seasonality in United Kingdom and Canadian Treasury
Bill Rates? 5 pages

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Seasonality in United Kingdom and
Canadian Treasury Bill Rates?

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A recent objective of U.S. debt management and monetary policy has been to limit downward pressures on short-term interest rates as one means of helping to restrain outward movements of short-term funds to foreign capital markets. In light of this policy the technical question has been raised as to whether there is a seasonal pattern to British and Canadian Treasury bill rates and whether these patterns differ from the seasonal pattern of the U.S. bill rate. Since early 1961 when the U.S. short-term rate policy was initiated, seasonal movements in U.S. Treasury Bill rates have been considerably damped, but in earlier years U.S. bill rates were seasonally high in December and seasonally low around mid-year. The purpose of this study is to see if there is a seasonal pattern in British and Canadian Treasury bill rates and to assess the importance of the seasonal fluctuations relative to cyclical and irregular influences. Monthly average rates have been subjected to the standard Federal Reserve Board computer programs for seasonal adjustment of time series.^{1/}

Three basic conclusions from this study are:

1. Seasonal movements in the series are much smaller than the trend-cyclical and irregular movements in the rate. Seasonal adjustment does not alter significantly the broad outline of major changes apparent in a simple graph of the raw data.
2. The measurement of the seasonal movement of Treasury bill rates is less accurate than the measurement of seasonal movements in many other series because of sudden shifts in the rate due to rapid changes in market conditions induced by monetary policy.
3. In spite of the fact that the seasonal component in the U.K. and Canadian bill rate fluctuations is relatively small, there is definite evidence of a seasonal pattern. Seasonal factors for the United Kingdom bill rate range from about 94 to 105. In Canada, they cover a wider range. The monthly pattern is very different in the two countries. However, because the non-seasonal component of the bill rate series is so large, the seasonal factors which have been derived from this study refer only broadly to what has happened over recent years and can be expected to be of only limited use in considering possible future movements in the rate of any particular month.

^{1/} The statistics used in this paper are based on the seasonal adjustment by Methods X-9 and X-10 of the monthly averages of the United Kingdom rate between April 1952 and December 1962, and monthly averages of the Canadian rate between February 1953 and November 1962. A technical description of these techniques is available in: Research Department, Federal Reserve Bank of Atlanta, Techniques of Seasonal Adjustment: Seminar on Seasonal Adjustment Federal Reserve System, Washington, D. C., June 5 and 6, 1956.

The seasonal patterns

The United Kingdom rate was found to rise on the average during January to March, to fall from March to May, to rise from May to October, and to fall from October to January. The seasonal factors as measured by four slightly different methods are shown in Table A (at the end of the paper). The use of moving factors would show some major shifts for the months of March, April and May when methods X-9 and X-10 are applied. This suggests that the seasonal pattern has not remained stationary over the time period examined.

That there is some consistent seasonal pattern is indicated by the fact that the bill rate fell in eight years out of ten between March and April and in eight years out of eleven from October to November. (See the last two lines of Table B, below.) However, during the other months, the seasonal pattern is not consistent from year to year. For example, between January to March, in four years out of ten, the rate moved in the opposite direction from that predicted by the seasonal factors. (See the top four lines of Table B.)

The seasonal pattern in the Canadian rate was found to be a sharp rise from October to December, a sharp dip from December to May, and an uncertain but mostly level pattern between May and October. Seasonal factors for the Canadian rate measured by three slightly different methods are shown in Table C. Seasonal movements are considerably larger than for the United Kingdom rate and differently timed. However, there is no consistent movement from year-to-year according to the described seasonal pattern--as Table D shows, the most consistent pattern is the sharp rise in December and the subsequent decline in January.

Relative importance of the seasonal fluctuations

While a reasonably consistent seasonal pattern is apparent in the fluctuations of the U.K. Treasury bill rate, these movements are much less important than the trend-cycle and random influences. The seasonal component in the U.K. bill rate fluctuations was only half the size of the trend-cycle component and two-thirds the size of the irregular component. (See Table 1.) For Canada, the trend-cycle and irregular components were of even greater relative significance. These results may be contrasted with production series which are affected to an important extent by seasonal factors. The seasonal components in the fluctuation of beef production and of natural gas production are larger than combined effects of the trend-cycle and irregular components.

A second indication of the lesser importance of the seasonal component is shown by the contrast between the "smoothing" action of the seasonal factors in the Treasury bill rate series and typical production series. This is shown in the lower half of Table 1, where the average month-to-month changes in the four time series is compared before and after seasonal adjustment. The average month-to-month fluctuations in the U.K. and Canadian bill rates were not significantly affected, but the average month-to-month fluctuations of the two selected production series were reduced very substantially.

Table 1. Seasonal, Trend-Cycle and Irregular Components of
Fluctuations in U.K. and Canadian Treasury Bills as
Contrasted with Typical Production Series

	<u>Bill Rates</u>		<u>Production Series</u>	
	<u>U.K.</u>	<u>Canada</u>	<u>Beef</u>	<u>Natural Gas</u>
<u>Seasonal vs. Trend-Cycle and Irregular Components</u> ^{1/}				
Seasonal	1.94	2.56	3.23	3.77
Trend cycle	3.91	5.68	.88	.67
Irregular	3.02	5.78	2.22	1.46
<u>Month-to-Month Percentage Changes (Average)</u>				
Before seasonal adjustment	4.72	8.44	4.24	4.19
After seasonal adjustment	4.71	8.34	1.67	2.48

^{1/} Average month-to-month percentage change (ignoring signs) in the multiplicative components of the original series.

Table A: U. K. Treasury Bill Seasonal Factors

	1962 MOVING FACTORS X-10 <u>'52-'62</u>	1962 MOVING FACTORS X-9 <u>'52-'62</u>	STABLE FACTORS X-10 <u>'52-'62</u>	STABLE FACTORS X-10 <u>'57-'62</u>
JAN	98.8	98.6	97.6	100.8
FEB	101.9	101.6	101.2	100.8
MAR	103.6	100.3	103.8	99.8
APR	98.1	95.9	101.8	96.6
MAY	93.6	94.0	99.4	94.3
JUN	97.8	94.5	99.1	94.6
JUL	99.8	102.8	99.4	98.7
AUG	103.4	105.4	100.9	102.2
SEP	103.1	105.6	101.4	105.6
OCT	103.2	105.1	100.1	106.5
NOV	99.2	99.4	97.8	101.6
DEC	98.0	97.5	97.6	98.9

Table B: The Consistency of U. K. Treasury Bill Rate Movement

	<u>No. of years up</u>	<u>No. of years down</u>	<u>No Change</u>
JAN - MAR	6	4	0
MAR - MAY	2	7	1
MAY - OCT	7	4	0
OCT - JAN	3	6	1
MAR - APR	2	8	0
OCT - NOV	2	8	1

Table C: Canadian Treasury Bill Seasonal Factors

	1962 MOVING FACTORS X-10 <u>'53-'62</u>	1962 MOVING FACTORS X-9 <u>'52-'62</u>	STABLE FACTORS X-10 <u>'52-'62</u>
JAN	105.7	106.9	106.0
FEB	100.7	103.6	101.0
MAR	99.0	99.4	99.3
APR	95.6	95.6	95.9
MAY	94.5	88.4	94.8
JUN	95.6	95.7	95.8
JUL	101.5	102.9	95.9
AUG	99.4	98.1	98.7
SEPT	99.4	98.8	99.6
OCT	98.6	96.5	100.8
NOV	101.2	104.6	103.6
DEC	108.4	109.1	108.6

Table D: The Consistency of Canadian Treasury Bill Rate Changes

	<u>No. of years up</u>	<u>No. of years down</u>	<u>No Change</u>
DEC - FEB	3	6	0
FEB - JUL	6	4	0
JUL - OCT	5	5	0
OCT - DEC	5	4	0