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Economic Indicators: The US-Canadian Experience

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Foreign Exchange Forecasting and Leading Economic Indicators: The US-Canadian Experience

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ABSTRACT

All events in the economies of two nations affect the exchange rate relationship between their respective currencies. Economic events, financial activity, and governmental policies affect income, prices, interest rates, and financial markets. The relative movement of economic and financial variables determine the respective exchange rates between currencies. This study uses leading economic indicators as a proxy for expected economic conditions to forecast the relative movements of the exchange rates between the U.S. and Canada. The results indicate that a forecasting model using leading economic indicators lagged 5 periods can forecast future exchange rate movements as well as a martingale model. The consistency of this finding holds over the 32 years that were studied.

Foreign Exchange Forecasting and Leading Economic Indicators: The U.S.-Canadian Experience

The relationship between the value of currency or foreign exchange between two nations has been explained by Giddy (1976) using four related theories:

1. The purchasing power parity theory
2. The interest rate parity theory
3. The interest rate theory of exchange rate expectations and
4. The forward rate theory of exchange rate expectations.

Four main factors determine a country's international payments and receipts and therefore its demand and supply for currency: real income relative to foreign income number 1 above; the rate of domestic inflation relative to inflation in the foreign country numbers 3 and 4 above; the rate of interest in domestic markets relative to interest rates in foreign country number 2 above; and random factors such as resource discoveries and political decisions. The higher the country's real income, or growth of its real GNP, the greater the volume of imports and the greater the demand for foreign currencies. If the domestic country's rate of inflation rises relative to the rest of the world, its products become less competitive relative to foreign goods and the demand for foreign currency increases. The higher the rate of interest in a country, the more foreign capital will flow into the country's financial markets, the greater demand for its currency. Random events will have either positive or negative effects and should not systematically effect the currency relationship over long periods of time.

If these events and the relative changes of these events between two countries are related to leading economic indicators, then we can hypothesize a relationship between the relative movements of a country's leading economic indicators and the movement of the foreign exchange rates both spot and forward. The purpose of this paper is to investigate the relationship between leading economic indicators of two countries and the foreign exchange rates of those countries. Section I contains a review of the literature on foreign exchange forecasting and market efficiency. Section II contains a description of the data and methodology of this study. The results of the analysis are presented in Section III. Implications and conclusions are given in the final section.

I. Foreign Exchange Forecasting and Market Efficiency

If the market for foreign exchange is efficient, the implication for individuals who wish to forecast foreign exchange movements based on publicly available information is that they are wasting their time and effort. On the other hand if the markets are shown to be biased or new information which has not been reflected in current prices is identified, then the would be forecaster has at least the chance to successfully forecast future changes.

Fama (1970) in his cornerstone article has provided a useful format for describing market efficiency:

1. Weak Form Efficiency, all historic and current exchange rate information is impounded in the current exchange rate and is not useful for predicting future exchange rate movements.

2. Semi Strong Form Efficiency, all public information relevant to exchange rates is impounded in the current exchange rate so that future rates and their movements are not related to current information.

3. Strong Form Efficiency, all information both public and private is impounded in exchange rates so that it is impossible to consistently forecast exchange rates.

Extensive empirical testing of the Market Efficiency Hypothesis for Foreign Exchange Markets by Kohlhagen (1978), Levich (1979), Poole (1967), Dooley and Shafer (1976), Giddy and Dufey (1975), Logue and Sweeney (1977), Cornell and Dietrich (1978), Rogalski and Vinso (1977), Jacque (1981) and others all seem to support the notion of market efficiency for foreign exchange markets at least at the Semi Strong Form level. Based on this empirical evidence, the chance of finding a successful forecasting model based on generally available information appears slim. It is our contention that the information contained in leading economic indicators, when they are used to measure relative strengths and weaknesses of economies has not been fully exploited. And so, even though they are generally available, the information has not been fully impounded in the foreign exchange price setting process.

Calderon-Rossell and Ben-Horim (1982) add an additional dimension to foreign exchange forecasting, that is government actions. "The evidence seems to suggest that the behavior of foreign exchange rates is strongly determined by both the foreign exchange management policies pursued by the monetary authorities of the respective countries and the underlying economic forces determining foreign exchange rates." In effect, the foreign exchange forecaster must consider whether the central bank will permit the exchange rate to change and how long the central bank can prevent it from changing if market forces dictate that it should change. The success of failure of foreign exchange forecasting then hinges on the ability to not only predict economic forces but government actions. The use of leading economic indicators from both countries allows the forecaster to measure the relative degree as well as the type of problem which could lead to an exchange rate change. Given any degree of consistency in the governments response to a given problem, the only question that remains is the extent of the lag between the indication given by the relative leading indicator and the realization of this fact by the foreign exchange market. Hence by using leading economic indicators, in addition to economic forces we may be capturing a proxy for government actions in the lag structure of our forecasting model.

Jacque (1978) developed a four step forecasting model along the lines of Korth (1972). First, through a review of selected economic indicators, the forecaster will identify which countries have balance of payments that are in fundamental disequilibrium. Second, for the currencies of such countries, the forecaster will measure the pressure that market forces are exercising on prevailing exchange rates. Third, the level of central bank foreign exchange reserves gives an indication of the future point in time at which the central bank will no longer be in a position to defend the prevailing exchange rate. The fourth and crucial step is to predict the type of corrective policy that politically motivated decision makers are likely to implement. We use the leading economic indicators to achieve the second of these four steps. Once we have identified imbalances in the relative economic strength of the countries involved, we then proceed to determine a lag structure that has normally been associated with the foreign exchange markets reaction to the imbalance. This lag structure then is capturing two phenomena; 1) the time it takes for the market to react to identifiable economic imbalances, and 2) the time it takes for the government to decide it is useless to fight the market by intervention.

Given this background of market efficiency and detailed instructions as to how to perform foreign exchange forecasting, we now turn our attention to the issue of how do forecasting services actually perform.

Goodman (1979) found upon examining the track record of six major econometric forecasting services that the predictive accuracy of most--not all--of the economics oriented foreign exchange rate forecasting services is so poor that they are likely to be of little use. The results are quite different for the technically oriented services. Their consistently very strong predictive performance supports the view that speculative runs do occur in the exchange markets and that the foreign exchange market is not efficient.

Levich (1980) has also examined the performance of advisory services, his conclusions both support and disagree with those of Goodman. He reports that the econometric based services outperformed the technical based services in the long run and the technical based services outperform the econometric services in the short run. He also reports that there may be some gains to be had for using forecasting services for advice, but he hedges this finding with the statement that these gains may not be sufficient to compensate for the transaction costs and risk which is required.

Overall this evidence on the efficacy of forecasting services in light of the evidence of market efficiency is still out with the jury. There is no decisive answer to the question of the usefulness of trying to forecast foreign exchange rates. The evidence is mixed on market efficiency, the market place commercially supports a myriad of foreign exchange services, which in some cases do well and in others perform poorly. Yet managers are required to formulate risk exposure plans and strategies for their organizations based on foreign exchange forecasting. We enter into this morass with a slightly different approach to the econometric forecast. By using leading economic indicators we hope to generate an improved model for foreign exchange forecasting.

II. Methodology and Data

The use of leading economic indicators (LEI) has been in use for a long period of time. Granger and Newbold (1977) present a detailed evaluation of the use of econometric models and LEI for predicting domestic time series relationships. Unlike econometric modeling, the LEI approach does not require assumptions about what causes individual economic behavior. Rather, it relies on statistically detecting patterns among variables which can be used to predict future movements. IT is in this spirit of predicting without theory (Auerbach (1968)) that we attempt to add a new dimension to foreign exchange forecasting.

In effect we are not defending the selection of which LEI's are the best predictors of forward exchange rate movement. However, given the "best" LEI predictors, we do have the argument of theory which provides that the movement of foreign exchange rates relies on the relative strength of monetary and real factors between countries. Further because countries trade on a multilateral basis rather than merely on a bilateral basis some further adjustments are needed to take account of how other countries can affect the U.S.-Canadian exchange rate. This involves taking account of the relative strength of the economies of all trading partners. This would involve a simultaneous equation approach to the basic model presented here and is left as a natural extension of our LEI prediction model which is still in the nascent stage at this point.

Given the theoretical and statistical basis for the existence of a relationship between LEI's and forward exchange rates we posit the following general model:

$$\text{forward exchange rate } \left(\frac{\$\ \text{US}}{\$\ \text{Canadian}}\right)_T = \alpha + \beta_1 \sum_{t=-M}^{T} \left(\frac{\text{LEI}_1\text{US}}{\text{LEI}_1\text{Canada}}\right)_t + \ldots + \beta_N \sum_{t=-M}^{T} \left(\frac{\text{LEI}_N\text{US}}{\text{LEI}_N\text{Canada}}\right)_t + e_t \qquad (1)$$

where α, β_1, ..., β_N are OLS regression coefficients

$\left(\frac{\text{LEI}_i\text{US}}{\text{LEI}_i\text{Canada}}\right)_t$ is the ith leading economic indicator for the US relative to Canada at time t

$-M$ to T is the time interval over which the LEI's are lagged

e_t is a random error term

In order to select the best LEI's from the total set of LEI's available we followed the following procedure:

(1) Initially, 28 sets (28 from the U.S. and 28 from Canada) of LEI's were considered. The sample was cut to 14 sets after the sample was screened for data availability. This criteria required a complete

set of observations over the entire sample period, January 1952 to April 1983.

(2) Several tests for determining multicollinearity among the remaining independent variables were performed. Two general procedures for determining possible multicollinearity were used:

2A A multiple regression on the forward exchange rate for all fourteen independent LEI's were run. Then separate regressions for each LEI against the forward rate were run. A comparison of the estimated coefficients between the multiple regression and the simple regressions indicated whether the coefficients of the LEI's changed, which would indicate the presence of multicollinearity among the independent variables.

2B An analysis of the covariance between the estimated parameters was also done to help identify multicollinearity.

The results of both 2A and 2B indicated the presence of multicollinearity among the independent variables. Hence a procedure to select the independent variables was undertaken which would reduce the problem of collinearity between the U.S. and Canadian LEI's and the multicollinearity between the various LEI's. The simplest solution to the problem of collinearity between complimentary variables, the U.S. LEI and the Canadian LEI, was to create a new variable which incorporated the effects of both variables. All complimentary variables were expressed as ratios of the form $\frac{\text{LEI US}}{\text{LEI Canada}}$ as shown in equation 1.

Ultimately four LEI variables were selected as independent variables. A weighted average called the general leading index (LDT), a stock price index (SP), industrial materials price index (PIM), and industrial production (IP) were considered the "best" (least multi-collinear) LEI's.

The impact of the LEI's on the forward exchange rate was considered not to be contemporaneous but rather distributed over a period of time. We used the Almon polynomial lag, although other type lagged relationships need to be considered, we left this for future research. We expected that the impact of the independent variable on the exchange rate would increase to some maximum then decrease which fits the Almon lag. We arbitrarily selected the number of lagged periods to be either 5 or 1 as there is no way of inferring that the true length of the lag is shorter than the one selected or that a longer lag period would be worth the reduction in the degrees of freedom. By choosing two different lag periods we can evaluate the improvement (if any) of the longer lag structure.

We specified four forms of the general model that would be used in predicting the forward rate. These four forms are shown in Table I.

All of the four forms of the model exhibited a low Durbin Watson statistic.[1] Therefore we used the Corchrane-Orcutt procedure to control for the problem of first order serial correlation. This will allow us to have unbiased efficient OLS estimates and also have more reliable R^2 as well as t and F statistics.

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[1] $$d = \frac{\sum_{t=2}^{N} (\hat{U}_T - \hat{U}_{T-1})^2}{\sum_{T=1}^{N} \hat{U}_T^2}$$

where $\hat{U}_T$ is the estimated residual from the OLS regression.

Table I

Forward Exchange Rate Models

I. Additive Form Lagged 5 Periods

$$\text{Forward Rate}\left(\frac{US}{Canada}\right)_T = \alpha + \beta_1 \sum_{t=-4}^{0}\left(\frac{US\ PIM}{CA\ PIM}\right)_t + \beta_2 \sum_{t=-4}^{0}\left(\frac{US\ LDT}{CA\ LDT}\right)_t + \beta_3 \sum_{t=-4}^{0}\left(\frac{US\ IP}{CA\ IP}\right)_t + \beta_4 \sum_{t=-4}^{0}\left(\frac{US\ SP}{CA\ SP}\right)_t + e_t$$

II. Multiplicative Form Lagged 5 Periods

$$\text{Forward Rate}\left(\frac{US}{Canada}\right)_T = \log \alpha + \beta_1 \log \sum_{t=-4}^{0}\left(\frac{US\ PIM}{CA\ PIM}\right)_t + \beta_2 \log \sum_{t=-4}^{0}\left(\frac{US\ LDT}{CA\ LDT}\right)_t + \beta_3 \log \sum_{t=-4}^{0}\left(\frac{US\ IP}{CA\ IP}\right)_t + \beta_4 \log \sum_{t=-4}^{0}\left(\frac{US\ SP}{CA\ SP}\right)_t + e_t$$

III. Additive Form Lagged 1 Period

$$\text{Forward Rate}\left(\frac{US}{Canada}\right)_T = \alpha + \beta_1\left(\frac{US\ PIM}{CA\ PIM}\right)_{T-1} + \beta_2\left(\frac{US\ LDT}{CA\ LDT}\right)_{T-1} + \beta_3\left(\frac{US\ IP}{CA\ IP}\right)_{T-1} + \beta_4\left(\frac{US\ SP}{CA\ SP}\right)_{T-1} + e_t$$

IV. Multiplicative Form Lagged 1 Period

$$\text{Forward Rate}\left(\frac{US}{Canada}\right)_T = \log \alpha + \beta_1 \log\left(\frac{US\ PIM}{CA\ PIM}\right)_{T-1} + \beta_2 \log\left(\frac{US\ LDT}{CA\ LDT}\right)_{T-1} + \beta_3 \log\left(\frac{US\ IP}{CA\ IP}\right)_{T-1} + \beta_4 \log\left(\frac{US\ SP}{CA\ SP}\right)_{T-1} + e_t$$

Complete statistics on all four models are presented in the next section of the paper.

The next issue we addressed was the selection of alternative models against which we could compare the performance of the four LEI models. A model investigated by Porter (1971) among others, tested the relationship between interest rates and the forward rate and is shown in equation 2.

$$\frac{\text{Spot}\left(\frac{\text{US}}{\text{Canada}}\right)_{t+90}}{\text{Spot}_t} = \alpha + \beta \frac{(1+90 \text{ day U.S. T-Bill Rate})}{(1+90 \text{ day Canadian T-Bill Rate})} + \mu_t \quad (2)$$

where t+90 is the spot rate 90 days after time t

The second benchmark model we considered was the martingale shown in equation 3.

$$E(\text{Spot Rate}_{t+1} | \phi_T) = \text{Spot Rate}_t \quad (3)$$

where ϕ_T is the information available at time T

E( ) is the conditional expectations operator.

In assessing the accuracy of the forecasts generated by each of the four LEI models and the two benchmark models, Theil's (1966) U statistic and decomposition measures were used. Theil's U statistic for measuring the accuracy of forecasts is:

$$U = \sqrt{\frac{\text{MSE}}{\frac{\Sigma A_i^2}{n}}} \quad (4)$$

where MSE is the mean square error of the model

A_i is the actual value of what is being predicted.

For perfect forecasts the value of U would be zero, as the accuracy of the forecast decreases, the value of U increases.

The decomposition measures of bias, variance, and covariance gives us some information about the accuracy of the forecast. The first term, bias component indicates the extent to which the magnitude of the MSE is the consequence of a tendency to estimate too high or too low a level for the forecasted variable. The variance component indicates the magnitude of the MSE attributed to the difference in the variance of the prediction compared to the variance of the actual values. And the covariance component measures the similarity of the covariances of the predicted and actual values. Of the three components, the first one is the most important. If it is large, it means that the average predicted change deviates substantially from the average actual change. This indicates a poor predictor. An alternative decomposition of the MSE into bias, regression and disturbance was also evaluated. The bias is as described above. The regression component is zero for the perfect predictor. And the disturbance component is the variance of the residuals obtained by regressing the actual relative changes on the predicted changes, the larger this number the poorer the forecast.

The selection of the U.S. and Canada for the critical examination of the LEI model was based on the belief that there was a greater likelihood of success if the two countries were closely related. The period of study covered January 1952 to April 1983. During this time there were changes in the Canadian Government's policy regarding foreign exchange rate maintenance. Based on these considerations we divided the sample data into four separate time periods: June 1952 to September 1961, October 1962 to October 1969, November 1970 to July 1976, and August 1977 to April 1983. Between each time period we left a twelve month gap. These months were used as the holdout sample upon which the various models could be tested. In effect we generated the six models for each of the time periods, and then based on the model for a given period predicted the next six months of foreign exchange rates.

During the first period June 52 to September 61 the exchange rate was managed. During the second period the exchange rates were fixed. Beginning in 1970 the Canadian dollar was allowed to float. The final period is one of floating rates, but with increasing intervention by the Canadian monetary authority.

The Leading Economic Indicators of the U.S. and Canada were obtained from the Center for International Business Cycle Research at the Graduate School of Management, Rutgers University. A list of the LEI's is given in Appendix A.

Foreign exchange rates for the U.S. and Canada both Spot and 90 day Forward were collected for the January 1952 to April 1983 period. This data was taken from the Bank of Canada Statistical Summary Supplement. Short term, ninety day interest rates for U.S. and Canadian T-Bills were collected from the Federal Reserve Bulletin and the Bank of Canada Statistical Summary.

Broadly speaking we can consider two methods of forecasting, 1) naive methods and 2) regression methods. In our study we will use the martingale model as one representative of the naive approach. The interest rate model will be a subclass of the regression models which have some basis in theory in this case the interest rate parity theory.

The other general class of regression models are those that are purely autoregressive or Box Jenkins type approaches, that is the forecasted variable is regressed on past values of itself. The four models using LEIs that we will investigate fall somewhere in between a pure regression approach and the autoregressive approach.

We first estimated the relationship between the forecasted variable and some of the explanatory LEI's over each of the four periods. These regression results appear in the next section. Then we predict for the holdout period the forecasted variable, given the LEIs and the coefficients from the regression model. And then compare the forecasted value with the actual value and assess the accuracy of the forecast. The results of these comparisons are presented in the next section.

III. Results

In Table II the result of the regressions run for the four LEI models and the interest rate parity theory model are presented.

The model which explains the variations of the 90 day forward rate between the U.S. and Canada the best is the LEI multiplicative 5 period lag model. Although the additive form of the LEI 5 period lag model is almost as good. Of interest is the relative stability of the performance of the model over the four diverse time periods. The reason for the poor performance of the interest rate model is probably indicative of the Bank of Canada's policy for intervention in the foreign exchange market independent of the country's monetary policy.

It is one thing to be able to explain the variability of exchange rates based on historic data and quite another to forecast the movements

Table II

Regression Results

Model	June 1952 - September 1961			October 1962 - October 1969			November 1970 - July 1971			August 1977 - October 1982		
	$\bar{R}^2$*	F	D.W.	$\bar{R}^2$	F	D.W.	$\bar{R}^2$	F	D.W.	$\bar{R}^2$	F	D.W.
Additive 5 Period Lag	.88	47.3	1.8	.73	11.8	1.6	.91	31.1	1.7	.91	27.7	1.8
Multiplicative 5 Period Lag	.89	48.9	1.8	.74	11.8	1.8	.91	31.1	1.7	.91	27.9	1.8
Additive 1 Period Lag	.04	1.08	1.9	.03	.51	1.8	.05	.79	1.6	.54	18.9	1.8
Multiplicative 1 Period Lag	.87	177.7	1.9	.72	49.7	1.4	.87	109.0	1.5	.86	83.8	1.8
Interest Rate	.02	2.2	1.6	.00	.03	1.4	.08	5.4	1.6	.02	.002	1.6

*$\bar{R}^2$ is the adjusted R^2.

F is the F statistic.

D.W. is the Durbin Watson statistic.

in exchange rates. The results indicating the forecasting accuracy of the 6 models (4 LEI, 1 Interest Rate, 1 Martingale) for the six months immediately following the four time periods are shown in Table III.

It is common practice to report the decomposition of the MSE into the components U^S and U^C. However Granger and Newbold (1973) argue that it is impossible to give any meaningful interpretation of U^S and U^C. In this line we will evaluate the efficacy of the models based on U, U^M and U^R. In Table IV the six models are ranked for forecasting accuracy from 1 to 6 over each of the four periods.

Based on the rankings, it is clear that the martingale model is the most accurate of the predictors for each of the subperiods except the third, where the LEI additive 5 period lag model was slightly more accurate. Of interest is the runner up model, the LEI additive 5 period lag model, it is ranked second over each of the intervals except the third when it is marginally ranked the best. The stability of the rankings is fairly consistent over the various subintervals. Overall these results hold some promise for the LEI approach to foreign exchange rate forecasting.

IV. Conclusion

The forecasting of foreign exchange rates in an efficient market has received considerable attention from both academics and practitioners as evidenced by the extensive nature of the literature discussed in Section I. This paper presents an alternative approach to foreign exchange rate forecasting which has not yet become a part of the growing literature on foreign exchange forecasting. The results indicate that

Table III

Forecasting Results

Forecast Period*	October 1961 - March 1962						November 1969 - April 1970						August 1976 - October 1976						November 1982 - April 1983					
Model	U	U^M	U^S	U^C	U^R	U^D	U	U^M	U^S	U^C	U^R	U^D	U	U^M	U^S	U^C	U^R	U^D	U	U^M	U^S	U^C	U^R	U^D
Additive 5 Period Lag	.022	.959	.011	.029	.038	.001	.004	.973	.0002	.026	.023	.003	.007	.0001	.882	.117	.216	.783	.013	.797	.089	.112	.180	.022
Multiplicative 5 Period Lag	.353	.999	.0004	.0002	.0003	.0003	.342	.999	.0006	.0003	.0004	.0004	.369	.999	.0005	.0000	.0003	.0003	.748	.999	.0005	.0000	.0005	.0000
Additive 1 Period Lag	.211	.170	.821	.008	.829	.0001	.213	.165	.829	.004	.834	.002	.212	.167	.769	.062	.830	.001	.211	.153	.833	.013	.846	.0000
Multiplicative 1 Period Lag	.023	.970	.019	.010	.022	.007	.031	.000	.0000	.0000	.0000	.0000	.082	.987	.009	.002	.0000	.012	.424	.996	.0003	.003	.001	.002
Interest Rate	.011	.988	.011	.0000	.011	.0001	.035	.982	.016	.0000	.015	.002	.089	.249	.695	.054	.309	.440	.024	.992	.007	.0001	.002	.005
Martingale	.002	.567	.001	.431	.024	.408	.0004	.512	.059	.428	.188	.298	.008	.141	.003	.854	.146	.712	.003	.047	.0008	.951	.693	.258

U Theil's U Statistic $= \sqrt{\dfrac{MSE}{\Sigma A_t^2/n}}$

U^M Bias Proportion $= \dfrac{(\overline{P}-\overline{A})^2}{MSE}$

U^S Variance Proportion $= \dfrac{(\sigma_P-\sigma_A)^2}{MSE}$

U^C Covariance Proportion $= \dfrac{2(1-r)\sigma_P\sigma_A}{MSE}$

U^R Regression Proportion $= \dfrac{(\sigma_P-r\sigma_A)^2}{MSE}$

U^D Disturbance Proportion $= \dfrac{(1-r^2)\sigma_A^2}{MSE}$

A_t is actual value

$\overline{P}$, $\overline{A}$ average prediction, average actual

σ_P^2, σ_A^2 variance of predicted, variance of actual

r correlated coefficient between p and a

For Perfect Predictor:

$U, U^M, U^R \rightarrow 0$

Table IV

Ranking of Model Forecasting Accuracy

Model	Oct 61 - March 62	Nov 69 - April 70	August 76 - December 76	Nov 82 - April 83
Additive 5 Period Lag	2	2	1	2
Multiplicative 5 Period Lag	6	6	6	6
Additive 1 Period Lag	5	5	5	4
Multiplicative 1 Period Lag	3	3	3	5
Interest Rate	4	4	4	3
Martingale	1	1	2	1

a model using leading economic indicators lagged for 5 periods can forecast future exchange rate movements almost as well as the naive martingale model. The stability of the model over various sub-intervals constructed over the past 32 years is quite encouraging.

Two paths for future evaluation, testing and improvement of this approach will be investigated by further research: 1) the creation of a trading rule based on the LEI model adjusted for transaction costs will be evaluated with respect to profit or loss experienced by taking a foreign exchange position based on model predictions and 2) the creation of a composite model based on the LEI and martingale model in some sort of a sub martingale framework.

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Appendix A

CORRESPONDENCE BETWEEN SERIES IDENTIFIERS ON MACHINE READABLE TAPE AND TITLES ON HISTORICAL PRINTOUTS

(CA=CANADA; FR=FRANCE; IT=ITALY; JA=JAPAN; UK=UNITED KINGDOM; US=UNITED STATES; WG=WEST GERMANY)

CAHRM	AVERAGE WORKWEEK, MANUFACTURING, HOURS PER WEEK (M)
CAINC	INITIAL CLAIMS, UNEMPLOYMENT INSURANCE, THOUSANDS (M) - INVERTED
CAODR	NEW ORDERS, DURABLE GOODS, MILLION 1971$ (M)
CAOMER	NEW ORDERS, MACHINERY AND EQUIPMENT, MILLION 1971$ (M)
CANBPR	NONRESIDENTIAL BUILDING PERMITS, TEN THOUSAND 1971$ (M)
CARBP	RESIDENTIAL BUILDING PERMITS, NUMBER (M)
CACVUR	CHG. IN NONFARM BUSINESS INVENTORIES, MILL. 1971$, ANN. RATE (Q)
CAPIM	INDUSTRIAL MATERIALS PRICE INDEX, NSA, 1975=100 (M)
CASP	STOCK PRICE INDEX, TORONTO STOCK EXCHANGE, NSA, 1975=1000 (M)
CACPAR	CORPORATE PROFITS AFTER TAXES, MILLION 1971$, ANNUAL RATE (Q)
CAPXLM	RATIO, PRICE TO UNIT LABOR COST, MANUFACTURING, 1971=100 (M)
CACCCR	CHANGE IN CONSUMER CREDIT OUTSTANDING, MILLION 1971$ (M)
CALD	LEADING INDEX, 1967 = 100
CALDT	LEADING INDEX ADJUSTED TO GNP TREND, 1970 = 100
CASL6M	SIX MONTH CHANGE IN ADJUSTED INDEX, ANNUAL RATE, PERCENT
CAL6SM	SIX MONTH SMOOTHED CHANGE IN ADJUSTED INDEX, ANN. RATE, PERCENT
CAL12M	TWELVE MONTH SMOOTHED CHANGE IN ADJUSTED INDEX, PERCENT
CAYR	PERSONAL INCOME, TEN MILLION 1971$, ANNUAL RATE (Q)
CAGNPR	GROSS NATIONAL EXPENDITURES, TEN MILLION 1971$, ANNUAL RATE (Q)
CAIP	INDUSTRIAL PRODUCTION, 1971=100 (M)
CARTR	RETAIL TRADE, MILLION 1971$ (M)
CAENF	NONFARM EMPLOYMENT, THOUSANDS (M)
CAUR	UNEMPLOYMENT RATE, PERCENT (M) - INVERTED
CACO	COINCIDENT INDEX, 1967 = 100
CACOT	COINCIDENT INDEX ADJUSTED TO GNP TREND, 1970 = 100
CAC6M	SIX MONTH CHANGE IN ADJUSTED INDEX, ANNUAL RATE, PERCENT
CAC6SM	SIX MONTH SMOOTHED CHANGE IN ADJUSTED INDEX, ANN. RATE, PERCENT
CAC12M	TWELVE MONTH SMOOTHED CHANGE IN ADJUSTED INDEX, PERCENT
FRHRML	AVG. WORKWEEK, MFG, HRS. DATA JAN, APR, JUL, OCT. REST INTERP.
FRINC	NEW UNEMPLOYMENT CLAIMS, THOUSANDS (M) - INVERTED
FRCU	CHANGE IN UNFILLED ORDERS, TOTAL, % BAL., 2-MO. CHG. (M)
FRHP	BUILDING PERMITS, RESIDENTIAL, THOUSANDS (M)
FRCIR	CHANGE IN STOCKS, BILLION 1970 FRANCS (A)
FRWPRM	WHOLESALE PRICE INDEX RAW MATERIALS, NSA, 1975=100 (M)
FRSP	INDEX OF STOCK PRICES, NSA, 1975=100 (M)
FRPXLM	RATIO, PRICE TO UNIT LABOR COST, MANUFACTURING, 1975=100 (Q)
FRLD	LEADING INDEX, 1967=100
FRLDT	LEADING INDEX ADJUSTED TO GNP TREND, 1970=100
FRL6M	SIX MONTH CHANGE IN ADJUSTED INDEX, ANNUAL RATE, PERCENT
FRL6SM	SIX MONTH SMOOTHED CHANGE IN ADJUSTED INDEX, ANN. RATE, PERCENT
FRL12M	TWELVE MONTH SMOOTHED CHANGE IN ADJUSTED INDEX, PERCENT
FRGNPR	GROSS DOMESTIC PRODUCTION, BILLION 1970 FRANCS (Q)
FRIP	INDUSTRIAL PRODUCTION, 1975=100 (M)
FRRTR	RETAIL SALES, 1975=100 (M)
FRENF	EMPLOYMENT, NONFARM, 1975=100. DATA JAN, APR, JUL, OCT. REST INTERP.
FRRU	REGISTERED UNEMPLOYED, THOUSANDS (M) - INVERTED
FRCO	COINCIDENT INDEX, 1967 = 100
FRCOT	COINCIDENT INDEX ADJUSTED TO GNP TREND, 1970 = 100
FRC6M	SIX MONTH CHANGE IN ADJUSTED INDEX, ANNUAL RATE, PERCENT