A FORECASTING MODEL OF THE CANADIAN ECONOMY

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Abstract:
The main body of this paper consists of a description of an economic forecasting model of the Canadian Economy. The results of a preliminary estimation are presented. Use of the model as a forecasting tool is then discussed in relation to simulations that have been made.

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Preface

A Forecasting Model of the Canadian Economy is the second in the series of Staff Technical Papers prepared by the Economic Planning Branch.

This paper discusses on-going work on the development of a quarterly forecasting model for the Canadian economy. This model is distinctly "monetarist" in its approach and is, in certain respects a continuation of the work described in The Determinants of the Nominal Interest Rate also of this series.

The work here is not complete from two aspects. First, as noted in the text, certain of the equations could be improved. Second, a forecasting model is not genuinely complete until its predictive capacity has been tested by events.

Mr. Henry B.F. Lim and Mr. Glenn P. Jenkins, respectively economist and consultant working with the Aggregate Analysis Section prepared this report.

C.P. Honey
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TABLE OF CONTENTS

Introduction

Key requirements for any successful economic stabilization policy are (a) an accurate forecast of how the economy will behave over a certain period in the future, and (b) an understanding of the lags and size of the effects of particular government economic policies.

The development of econometric techniques and recent advances in economic theory have been largely concerned with providing information in these two areas. A number of econometric models have been constructed for the Canadian economy. In most cases these consist of a series of equations that establish what level aggregate demand will attain under various conditions and how the economy provides resources to meet this demand. The demand and supply position tells us whether the resources of the economy are fully employed, or whether there exists either an excess of demand, causing the price level to rise, or an excess of supply, leaving factors unemployed.

If such a "structural" model is to be used as a forecasting tool, then a large number of variables usually have to be estimated and used as inputs for the model when making forecasts. As the number of exogenous variables whose future values are known with some degree of certainty is relatively small, the usefulness of the model as a forecasting tool is limited. Not only is it difficult to use such a model for forecasting purposes, but also the cost of construction can be considerable. However, such a model is a useful device for learning how different exogenous forces cause the economic system to react and, more particularly, how the components of the economy are inter-related. If accurate historical data are available, such a model should yield information on various

multipliers and how the course of events would be altered if one or some of the exogenous variables behave differently.*

We conclude that the type of model which is most useful as an aid to forecasting is very different from one which is useful for examining the process by which different policy variables affect the economy. It was on this basis that we chose a "reduced-form" model for our forecasts.

The main body of this paper consists of a description of the economic framework of the model and the results of a preliminary estimation. Use of the model as a forecasting tool is then discussed in relation to simulations that have been made.

A more detailed discussion of the estimation of each equation will be taken up in our next report on the model's development. At present, only equation (2) is in satisfactory form; this equation explains interest rate movements. After intensive experiment using different explanatory variables and different lag structures the other equations were selected as being the least unsatisfactory. Research is currently being undertaken to improve the other equations of the model, with priority being given to the income and price equation.

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* The Aggregate Analysis Section has tested the RDXI and RDXF (Bank of Canada) structural models as forecasting tools. Simulations on both models were carried out in 1969. RDXF has also been used to generate a seven-year forecast for Canada from 1970-1976; these results are available upon request.

THE GENERAL ANALYTICAL FEATURES OF THE MODEL

The chief attraction of this model is its potential usefulness as a forecasting tool. With only six exogenous variables, the model still allows us to specify the level of many of the variables which the provincial government would refer to when proposing stabilization policies that would be most appropriate for all levels of government and for the monetary authorities.

The variables* which are exogenous to the model, as it is at present constructed, are as follows:

a) The past and prospective changes in total government fiscal stimulus - measured by the change in government expenditure on goods and services (excluding hospitals, including defense) plus direct transfers to persons (DEXP).

b) The past and prospective changes in the Canadian stock of money - defined here as total deposits of the public in commercial banks plus currency in the hands of the public (DM). Changes in the rate of growth of money supply are also used (DGM).

c) The past and prospective changes in levels of fixed capital formation per quarter - made exogenous for this short-run model, as the Dominion Bureau of Statistics constructs forecasts of this variable, one year in advance from a sample survey (DI).

d) Changes in the stock of the money supply of the United States - defined here as demand deposits plus time deposits plus currency in the hands of the public (DMUS).

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* The symbols used for a particular variable appear in brackets. A prefix "D" signifies the quarter by quarter change and "G" the percentage change from one quarter to the next.

e) The level of equilibrium real output - estimated to grow at the long-run trend growth rate of real output (YF).

f) The quarterly changes in the nominal value of exports (DX).

From the model, we are able to make estimates of the following variables:

a) The level (Y), changes (DY) and annual rates of growth (GY) of nominal gross national product.

b) The level (YR), changes (DYR) and annual rates of growth (GYR) of real gross national product.

c) The level (P), changes (DP) and annual rates of growth (GP) of the consumer price index.

d) The unemployment rate of the labour force (UNE).

e) Nominal interest rates, represented by the Canadian 3-month treasury bill rate (RO3).

f) Expectations of future price changes (DP*).

In our model, the central equation is the one used to explain changes in nominal income. This equation is estimated by using a reduced form procedure. This means that we do not try to specify the processes by which the exogenous variables change nominal income. Rather, we specify only the final, or total, effect on nominal income of a change in an exogenous variable. The assumption is made that the underlying structure of the economy changes very little over the period for which the forecasts are made. This assumption seems to be a reasonable one, especially when making only short-term predictions.

In most econometric models, the changes in real income are estimated as the solution of a system of simultaneous equations defined in real terms. Price changes are then calculated. This is usually done by comparing this level of real output with some full employment level, in order to determine the direction and size of the pressure on prices resulting from excess demand. A variable to measure the growth of input costs is also included and this almost always emphasises the growth in labour costs. Combining the growth rates of prices and real income, the growth rate of nominal income can be derived.

The approach that is taken in this paper is quite different. We estimate the changes in nominal income first. The reason for this approach is that the economy operates by using nominal variables whose real value change through time. As the corresponding real values are altered for a given nominal unit, people adjust their behaviour with respect to the nominal variables. In the real world, adjustment is not instantaneous and therefore, we must explain the speed and the way that people react to changes in prices and real output.

Our model is very similar to one that has been estimated for the United States[1] but, of course, there are significant differences that make the model suitable for use in forecasting the performance of the Canadian economy.

In Table I, the estimated equations are shown with the identities necessary for the completion of the model. The following section will be a discussion of the economic theory that each equation represents.

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[1] Anderson, Leonall C., and Carlson, Keith M., "A Monetarist Model for Economic Stabilization", Review, Federal Reserve Bank of St. Louis, April, 1970

TABLE 1

THE MODEL*

All data used are seasonally adjusted

$$DY = \underset{(1.609)}{48.359} + \sum_{i=0}^{4} a_i \, DM_{t-i} + \sum_{i=0}^{2} b_i \, DEXP_{t-i} + \sum_{i=2}^{7} c_i \, DMUS_{t-i} + \sum_{i=0}^{2} d_i \, DI_{t-i} + \sum_{i=0}^{3} e_i \, DX_{t-i}$$

Almon lag method, 2nd degree polynomials

a	=	.0428	(.595)	b =	.3719 (2.509)
a_1^0	=	.0985	(2.797)	b_1^0 =	.1209 (0.706)
a_2	=	.1219	(2.529)	b_2 =	-.0030 (-.018)
a_3	=	.1134	(2.034)		
a_4	=	.0728	(1.799)		

$\sum a_i = .449$ $\qquad$ $\sum b_i = .4958$

c	=	-4.081	(-.538)	d =	.6638 (3.496)
c^2	=	-0.817	(-.189)	d_1^0 =	.4687 (3.256)
c^3	=	1.414	(.381)	d_2^1 =	.2474 (1.739)
c^4	=	2.611	(.624)		
c^5	=	2.774	(.718)		
c_7^6	=	1.904	(.719)		

$\sum c_i = 3.804$ $\qquad$ $\sum d_i = 1.379$

e_0	=	.4150	(1.721)
e_1	=	.2622	(1.497)
e_2	=	.1383	(0.948)
e_3	=	.0432	(0.305)

$\sum e_i = .8587$

$R^2 = .5849$

D.W. = 2.315

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* Figures in brackets are "t" values;
R^2 is determination coefficient adjusted by degree of freedom;
D.W. is Dubin-Watson Statistics

2. Interest Rates

$$RO3 = 1.7712 + \sum_{i=0}^{4} a_i \, DGM_{t-i} + \sum_{i=1}^{4} b_i \, GYP_{t-i} + \sum_{i=1}^{10} w_i \, GP_{t-i}$$

Almon lag method, 2nd degree polynomials

a_0	=	-.0761	(-4.417)	w	= .2569 (11.606)
a_1	=	-.0975	(-7.114)	w_1	= .2068 (13.287)
a_2	=	-.1005	(-6.705)	w_2	= .1621 (14.494)
a_3	=	-.0853	(-5.937)	w_3	= .1228 (13.108)
a_4	=	-.0518	(-5.410)	w_4	= .0889 (9.373)
				w_5	= .0606 (5.990)
$\sum a_i$	=	-.41864		w_6	= .0376 (3.671)
				w_7	= .0200 (2.124)
b	=	.0117	(.875)	w_8	= .0079 (1.055)
b_1	=	.0065	(.762)	w_9	= .0012 (.284)
b_2	=	.0029	(.283)		
b_3		.0007	(.086)	$\sum w_i$	= .9648
b_4					
$\sum b_i$	=	.0218		R^2	= .796: D.W. = .715

3. Consumer Price Changes

$$DP = 1.0020 \, DP^* + \underset{(.66284)}{.00000176} \, DY_{t-4} + \underset{(.64278)}{.00000175} \, DY_{t-5} - \underset{(-1.29)}{.00000436} \, GAP_{t-1} + \underset{(1.920)}{.00000653} \, GAP_{t-2}$$

R^2 = .74: D.W. = 2.127

4. Expected Price Changes

$$DP^* = \sum_{i=1}^{10} w_i \, GP_{t-i} \, P_{t-i}$$

(coefficients are given in equation 1)

5. Full Employment Level Product

$$YF = e^{(a+bT)}$$

Where T is a time variable: 1947 first quarter = 1

e = constant of natural logarithm
a = 8.2499 (638.9)
b = .01187 (56.75)

6. Full Employment Gap

$$GAP = \frac{YR - YF}{YF} \times 100$$

7. Unemployment Rate

$$UNE = \underset{(54.1)}{5.062} - \underset{(-3.65)}{.2083}\ GAP_t - \underset{(-1.80)}{.1223}\ GAP_{t-1} - \underset{(-1.10^{*})}{.0785}\ GAP_{t-2} + \underset{(.607)}{.0409}\ GAP_{t-3} + \underset{(1.86)}{.1062}\ GAP_{t-4}$$

$$R^2 = .66; \quad D.W. = .35$$

8. Money Supply

$$M_t = M_{t-1} + DM$$

9. Rate of Changes of Money Supply

$$DGM = \frac{d^2 \log M_t}{dt^2}$$

10. Price Level

$$P_t = DP + P_{t-1}$$

11. Annual Growth Rates of Prices

$$GP = \frac{DP}{P_{t-1}} \times 400$$

12. Gross National Income

$$Y_t = Y_{t-1} + DY$$

13. Real National Output

$$YR = \frac{Y_t}{P_t}$$

14. Annual Growth Rates of Real National Output

$$GYR_t = \left(\frac{YR - YR_{t-1}}{YR_{t-1}} \right) \times 400$$

Nominal Income

Nominal income in this model is viewed as a measure of total aggregate demand. The part of aggregate demand which is not met by the supply of goods and services at the initial price level will produce the movements in the price level to equalize the nominal aggregate values of demand and supply.

We must now find the set of variables which, for the short-run period, are exogenous to the Canadian economy, but which influence the level of aggregate demand. These variables are used as the independent variables in the equation explaining changes in nominal income.

The variables set by government policy are the most obvious choices. These include total government expenditures, and the rate of expansion of the stock of money.

The monetary policy of the United States also has some effect on the level of aggregate demand in Canada. This will operate directly to increase the demand for Canada's exports by increasing nominal income in the U.S.. When credit conditions in the U.S. are slack, it may also make the international corporations more willing to re-invest their earnings in Canada rather than to withdraw profits and dividends. Easy credit conditions in the U.S. can, therefore, lead to an increase in the rate of fixed capital formation in Canada.

When preparing short-run forecasts (up to 6 quarters), the quantity of fixed capital formation can be used as an exogenous variable, although for longer periods it is clearly an endogenous variable.

There is often a fairly long delay between the time when financing is available and when materials are purchased and men hired. Because of this and the fact that the Dominion Bureau of Statistics produces forecasts of this variable (for 4 quarters), we have treated fixed capital formation as an independent variable.

The equation to explain nominal income was estimated in a reduced form. When using such a procedure, the coefficients measure the total effect of the particular variable on income and are, therefore, partial multipliers.

Of the variables considered, only the changes in the Canadian money supply, changes in total government expenditures, changes in the United States money supply, changes in exports, and changes in fixed capital formation gave results which were consistent with macro-economic theory and were statistically satisfactory.

Interest Rates

In this model only the equation explaining the three-month treasury bill rate was estimated. However, the same basic theory and variables could be used to estimate other interest rates of different maturity. It is to be expected, however, that the lag structure for the variables

which explain other interest rates would be somewhat different. A detailed explanation of the theory and estimation procedure which we used to construct this equation is found in a previous paper on this topic[2].

Consumer Prices

From the first equation in Table I, we are able to estimate the growth in nominal income. The next step is to determine what proportion of the growth in nominal income can be attributed to increases in prices on the one hand and to the expansion of real output on the other.

Instead of thinking of full-employment level of output as being a ceiling, we define it as being that level of output at which prices increase are at their long-run trend rate. When actual output is above the equilibrium level of output ("GAP" positive) we would expect prices to rise faster. And, when "GAP" is negative, prices should grow at a slower rate or even, in an extreme case, decline.

Expectations as to future price increases also play a very important, role and it is this variable which is important in explaining the behaviour of the economy. As expectations do not adjust

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[2] Jenkins, Glenn P., and Lim, Henry B.F., "The Determinants of the Nominal Interest Rate: An Empirical Study of the Canadian Case", Economic Planning Branch, Department of Treasury and Economics, (mimeo).

instantaneously, the economy can respond only slowly to altered conditions.

In the estimation of the equation to explain price changes, we used as explanatory variables the expected growth in prices, the growth in nominal income, and the difference between actual and equilibrium real output.

Unemployment Rate

The unemployment rate is explained as a function of the difference between actual and equilibrium real output (GAP). The constant in such an equation is very important as it tells us the level of unemployment that has been consistent with the trend of output at full employment. The value we obtained for the constant term in this estimation is 5.062 per cent. This result leads us to the conclusion that the governments in Canada should be fighting unemployment by methods which will change the structure of the labour market. We can only expect to bring unemployment below this level by these methods. The tools of monetary and fiscal policy are ineffective when attempting to reduce unemployment below about 5 per cent of the work force unless one is prepared to accept excessive inflation. However, this conclusion cannot be applied directly to the Province of Ontario as its labour market is, no doubt, better organised than those of the other provinces.

Further research will be carried out on this sector to see if the relationship between the unemployment rate and output is a stable one. The participation rates of different labour groups in the

work force, productivity rates, and the number of hours worked may be variables that should be included in the equations in order to more accurately explain unemployment rates in Ontario and Canada.

TESTING OF THE MODEL

In order to test the reliability of this model in predicting economic behaviour, we solved the equations for the endogenous variables each quarter to see if the differences between the actual and the predicted values followed a systematic pattern. (If such a pattern emerges, this is evidence that important variables have been left out of the equation).

These simulations were carried out using two sets of explanatory variables. The first set of explanatory variables was the actual historical data. This test enables us to detect any bias in our estimated equation. The second set of simulations used were the actual historical figures for DM, DG, DMUS, but for quarterly GNP and the consumer price index, the values generated by the model were used. These simulations allowed us to determine if the model accumulates its errors in one direction to such a degree that the values of the "level" variables calculated endogenously diverged considerably from the actual values. It is important that the model should not

have this property if we wish to carry out economic forecasts. When constructing forecasts of the endogenous variables for longer periods than the first quarter beyond the sample period, we have to use the values for the changes in gross national product and changes in the price level produced by the model itself to forecast the values of all the endogenous variables the following quarter. Therefore, we want the model to function so that the accumulation of errors does not become a large value in any direction. In other words, this test was made to reassure us of the validity of our equation specification (admittedly, in most cases the R^2 and DW values were low: this was partly because difference equations were used).

Nominal Income Equation

Equation (1), which has nominal income as the dependent variable, shows that changes in Canadian money supply have no immediate effect but become significant after a lag of one quarter. (The significance of the coefficients is assessed at the 95 per cent confidence level). However, the effect of government expenditures on nominal income is immediate and disappears within half a year.

Changes in fixed capital investment have a very important influence on the changes of nominal income, with the coefficients for the coincidental and one-quarter lag periods being significant at the 95 per cent level of confidence.

Changes in the United States monetary stock were introduced with a series of lags and the signs of the coefficients conform very well with the expected transmission mechanism. The coefficients for the first and second quarters after the change are negative but for the third quarter, the sign of the coefficient is positive, but is still very small. For lags of four to seven quarters the coefficients are much larger and remain positive, implying that U.S. money supply has a positive influence after a lag of four quarters, with the impact persisting for three quarters longer.

All the explanatory variables in this equation are exogenous. Therefore, it is possible to carry out simulations of the first type, using historical data. We estimated the level of nominal income for each quarter by adding the sum of all the estimated changes in nominal income for the quarters preceding that quarter to nominal income in the base quarter, 1954 first quarter.

The results come out very well; in no period is the difference between the estimated and actual levels of nominal income very serious (see Figure 1).

When we compare the estimated changes in nominal income with actual changes we get mixed results (see Figure 2). From 1964 to 1969 the equation explains the changes in nominal income very well. However, from 1954 to 1964 the values for the equation fluctuate around the trend of the actual values, but, on several occasions, prediction of turning points is not accurate.

One explanation of this is that, during the fifties, Canada was on a flexible exchange rate system, while in the sixties it was on a fixed exchange rate system. We would expect that the rate of reaction and the timing of nominal income to changes in Canadian fiscal and monetary policy, and to changes in United States monetary policy, would differ greatly under these two systems.

For this reason, we plan to estimate the equation for the fifties and sixties separately. This is especially important as we are once again on a flexible exchange rate, and it may be that a model which best explains the decade of the fifties will be more suitable for prediction purposes, now that once again the Canadian dollar has been allowed to find its own level.

Three-Month Treasury Bill Rate

The simulations which are carried out using the actual historical data for this equation produce estimates which are quite accurate (see Figure 3). The equation indicates the turning points of the actual series very accurately and shows no systematic bias.

It is significant that this equation is able to forecast both the turning point and the level of the treasury bill rate in the second and third quarters of 1970 with a high degree of accuracy, a period when the rate was declining very rapidly.[3]

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[3] Ibid

When we carry out simulations using actual values of the rate of change of the consumer price index and estimated values for real income changes (see equation 1), we find that, from 1964 to the present time, the equation indicates the turning points accurately, but the estimates are consistently lower than the actual interest rate. The reason for this is the inaccuracy with which our price equation estimates the oscillations in the growth of prices. In this case, the result we obtain in the latter simulation is evidence of the weakness of the price equation and not of an inadequacy of the interest rate equation.

The interest rate equation does give us some important insights into the timing and adjustment of the expectations of price increases, and into the movements of the actual price levels. If the rate of inflation goes up by 2 per cent, then expectations of future price increases will rise by 1 percentage point within 9 months, with a further adjustment to the full 2 per cent for 24 months of increased inflation.

This lag of expectations of price increase explain why it is difficult to arrest inflation once expectations have been formed, and why we observed in 1969 and early 1970, prices rising as rapidly as before the contractionary government policies, even though growth in output had slowed noticeably.

Consumer Price Changes

In this equation we find that the expected rate of change of the price level is the dominant variable in explaining the rate of change in the actual price level. Although both the change in nominal income and the gap between the level of actual and potential output are also included as explanatory variables, only the coefficient for the gap, lagged two quarters, has the correct sign and is significant.

The estimated values, in a simulation with all explanatory variables as exogenous variables, follow the trend of the actual rate of change of the price level quite well, but the quarter to quarter changes are much less effectively predicted (see Figure 4).

However, the equation is a very simple one, and a more sophisticated version of this hypothesis is to be tested.

Unemployment Rate

When we look at the simulations for the rate of unemployment, we find that the estimated values follow the actual values quite well. The explanatory variables used in this case is the gap between actual and potential output both coincidentally and at lags of one, two, three and four quarters. Where the gap between actual and potential output is estimated endogenously, we find that the errors caused by the price equation make it take on larger values, both negative and positive, than it should. This in turn causes the values in the

Figure 4 PERCENTAGE GROWTH RATES OF CONSUMER PRICE INDEX (GP)

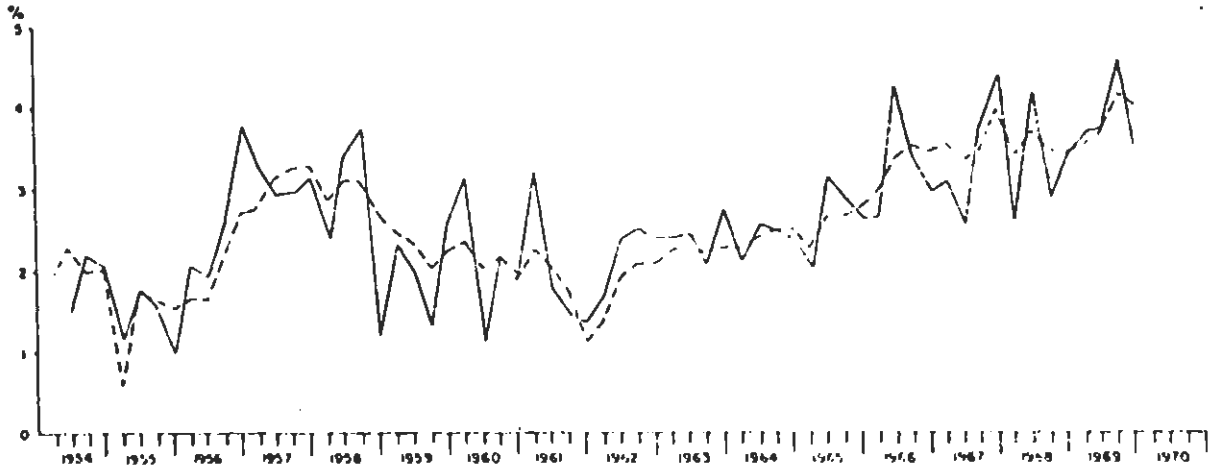
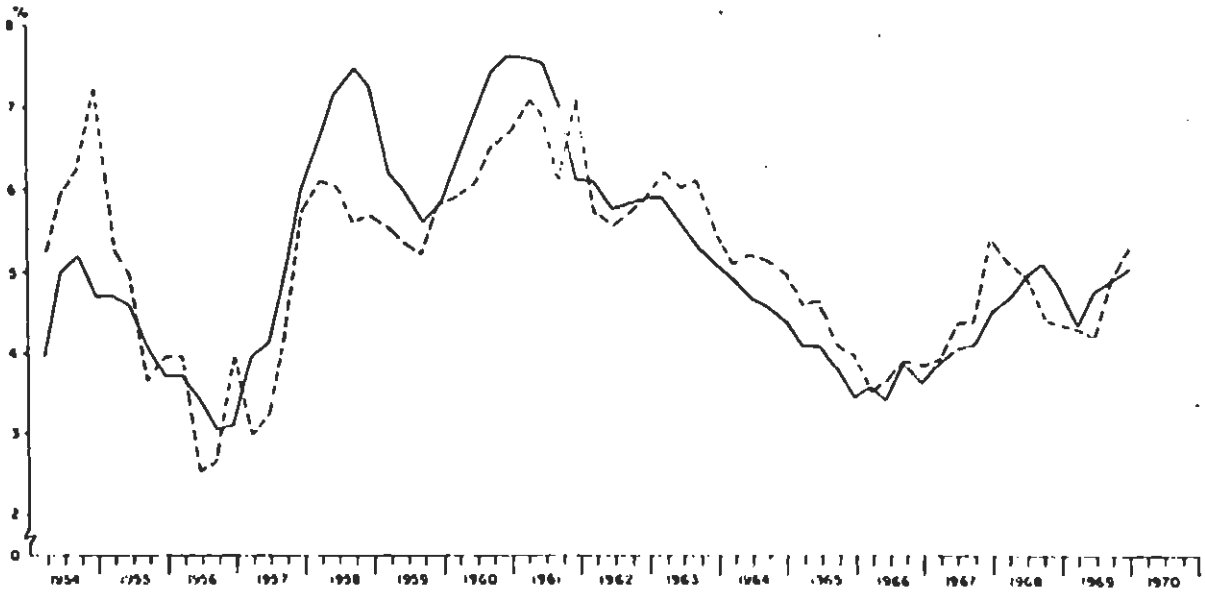


Figure 5 UNEMPLOYMENT RATE (UNE)



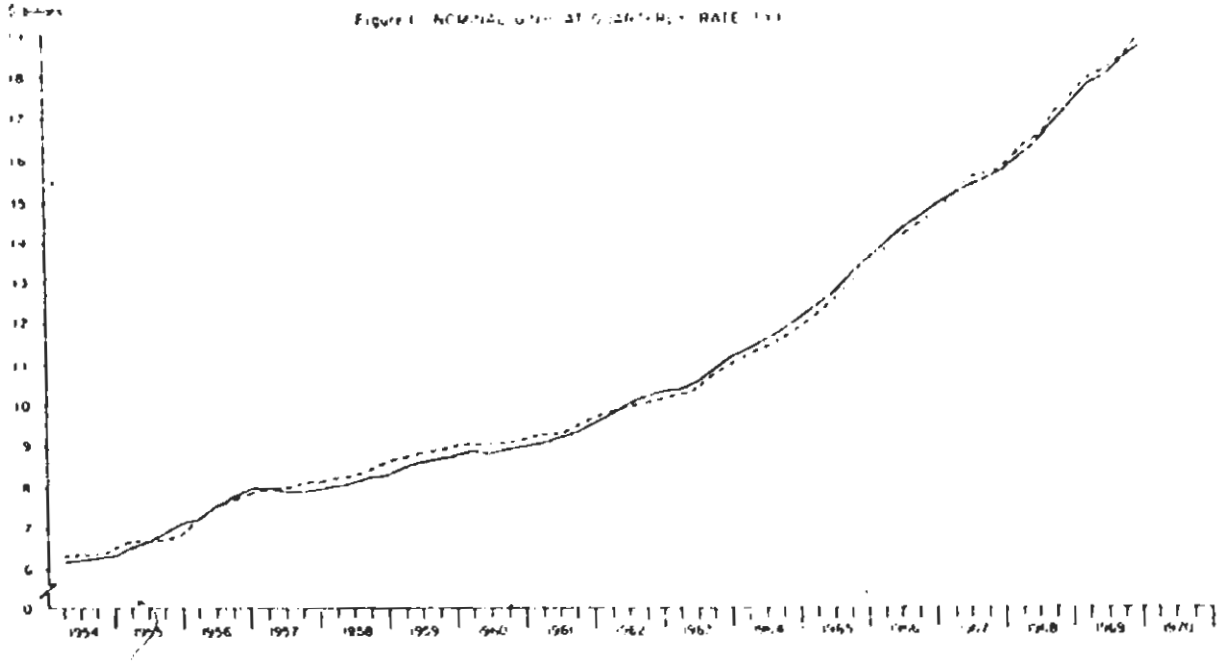
simulation of the unemployment equation to overshoot the actual values when the unemployment rate is falling and to underestimate the actual values when the rate of unemployment is rising.

When we carry out the simulations with all explanatory variables as exogenous variables, we find that the equation sometimes underestimates when the unemployment rate is falling (see Figure 5). This behaviour is caused by the movements in productivity, number of hours worked, and participation rates which vary over the business cycle. In future estimations of this equation we will introduce some of these additional variables as explanatory variables.

FORECASTS FOR 1971 AND CONCLUSION

While the simulations with the reduced form model using historical dats yield results which are encouraging, to see how the model behaves when used to forecast outside of the sample period, we constructed estimates of the endogenous variables from 1970 III to 1971 IV based on two sets of assumed conditions. The first set of exogenous (Set I) variables are based on the assumption that the governments will undertake a very expansionary economic policy and that Canada's exports grow very rapidly. The second set of exogenous variables (Set II) are based upon more moderate and probably more realistic assumptions as to the expansion of both exports and government fiscal and monetary policy (see Table II).

We find that except for the price equation, the model behaves quite well. A high rate of growth of nominal income of 10.5 for 1971 is



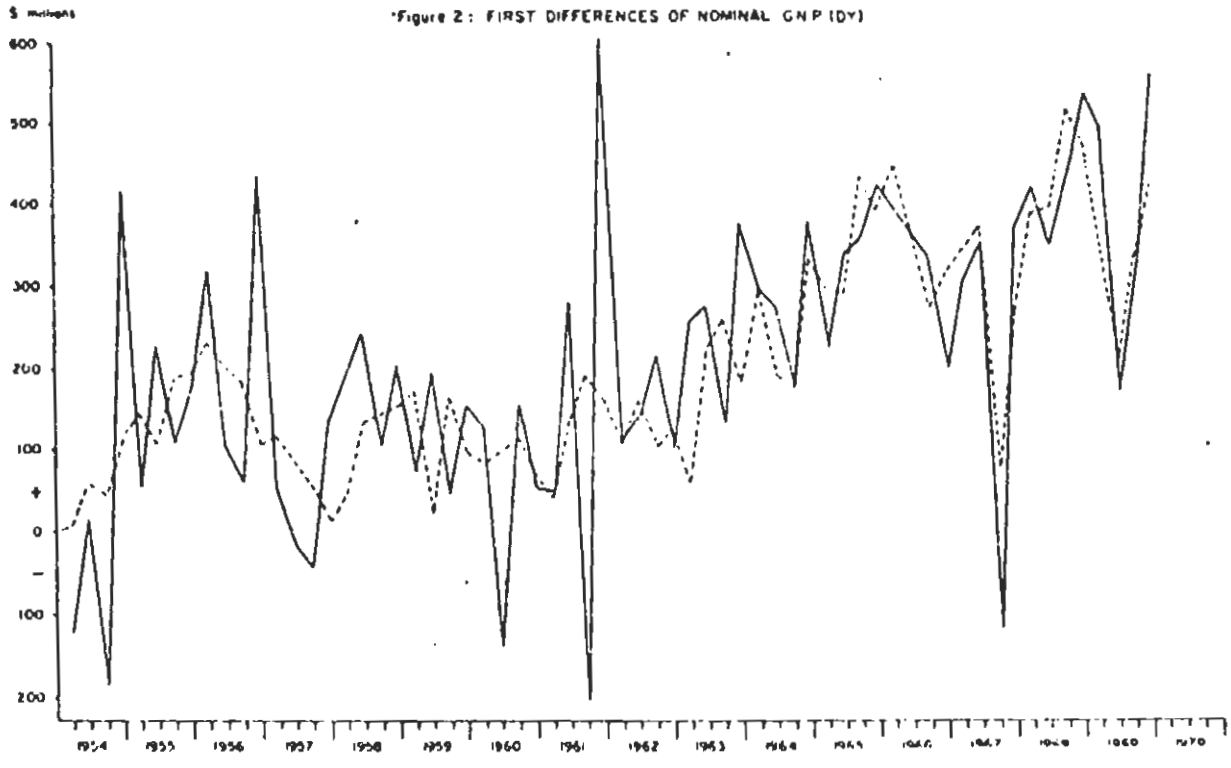


Figure 2: FIRST DIFFERENCES OF NOMINAL GNP (DY)

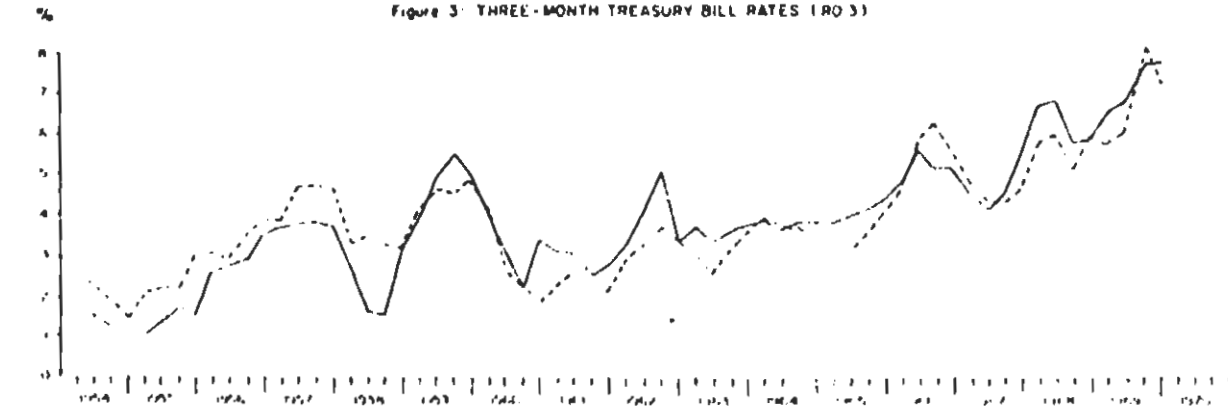


Figure 3: THREE-MONTH TREASURY BILL RATES (RO 3)

not implausible. Also with our more moderate assumptions, the growth of nominal income of 8.3 per cent is obtained; this appears to be quite reasonable also.

We believe that our research has shown that this type of econometric model can be useful for making short-run forecasts. For the province of Ontario, with its relatively limited data base, Canadian forecasts remain the most reliable source of indicators for measuring the level of economic activities in Ontario.

Our future research will be continuous effort to improve and update the model but still restricting the model size. The development of quantitative links between the Canadian indicators and the provincial economic indicators will be attempted.

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FORECASTS FOR CANADA 1970-1971

Values of the Exogenous Variables

	Growth in Nominal Canadian Money Supply at Annual Rates	Growth in total Nominal Government Expenditure at Annual Rates	Growth in Nominal U.S.A. money Supply at Annual Rates	Growth in Nominal fixed business capital formation at Annual Rates	Growth in Nominal Canadian Exports at Annual Rates	
70 III*	7.93	11.04	7.93	8.16	0.00	
70 IV	8.00	10.00	8.00	5.00	8.00	
71 I	8.00	10.00	8.00	5.00	12.00	Set I
71 II	8.00	10.00	8.00	6.00	10.00	
71 III	8.00	10.00	8.00	6.00	10.00	
71 IV	8.00	10.00	8.00	6.00	10.00	
70 III	7.93	11.04	7.93	5.00	0.00	
70 IV	6.00	8.00	8.00	5.00	6.00	
71 I	6.00	8.00	8.00	6.00	6.00	Set II
71 II	6.00	8.00	8.00	6.00	6.00	
71 III	6.00	8.00	8.00	6.00	6.00	
71 IV	6.00	8.00	8.00	6.00	6.00	

* Values of Exogenous Variables for 1970 III are historical data.

TABLE II (B)

FORECASTS FOR CANADA 1970-1971

Forecasts Obtained Using Exogenous Variables

	Nominal GNP $ millions	Growth Rate GNP Constant (1949)	Full Employment Real GNP $ millions	Consumer Price Index 1949=1.000	Three-month Treasury Bill Rates %	Average Rate of Unemployment %	Annual Rate of Inflation %	Annual Growth Rate of Real GNP %	Changes in GNP $ millions	
70 IV	20070	6.42	11960	1.710	4.711	6.776	4.711	1.709	317	
71 I	20540	9.35	12110	1.729	5.238	7.127	4.477	4.884	469	
71 II	21110	11.13	12250	1.747	5.668	7.337	4.197	6.984	574	Set I
71 III	21680	10.72	12400	1.764	6.732	6.880	4.279	6.740	565	
71 IV	22270	10.92	12540	1.782	6.307	6.595	4.047	6.894	593	
Average for 1971	21400	10.55	12325	1.756	5.986	6.986	4.250	6.375	550	
70 IV	19900	6.07	11960	1.710	4.596	6.791	4.711	1.365	300	
71 I	20470	8.22	12110	1.729	5.429	7.211	4.487	3.738	411	
71 II	20930	9.07	12250	1.747	5.856	7.569	4.228	4.845	466	Set II
71 III	21360	8.19	12400	1.765	6.880	7.329	4.031	4.160	424	
71 IV	21800	8.21	12540	1.783	6.385	7.305	4.087	4.125	438	
Average for 1971	21140	8.42	12325	1.756	6.138	7.354	4.208	4.217	435	