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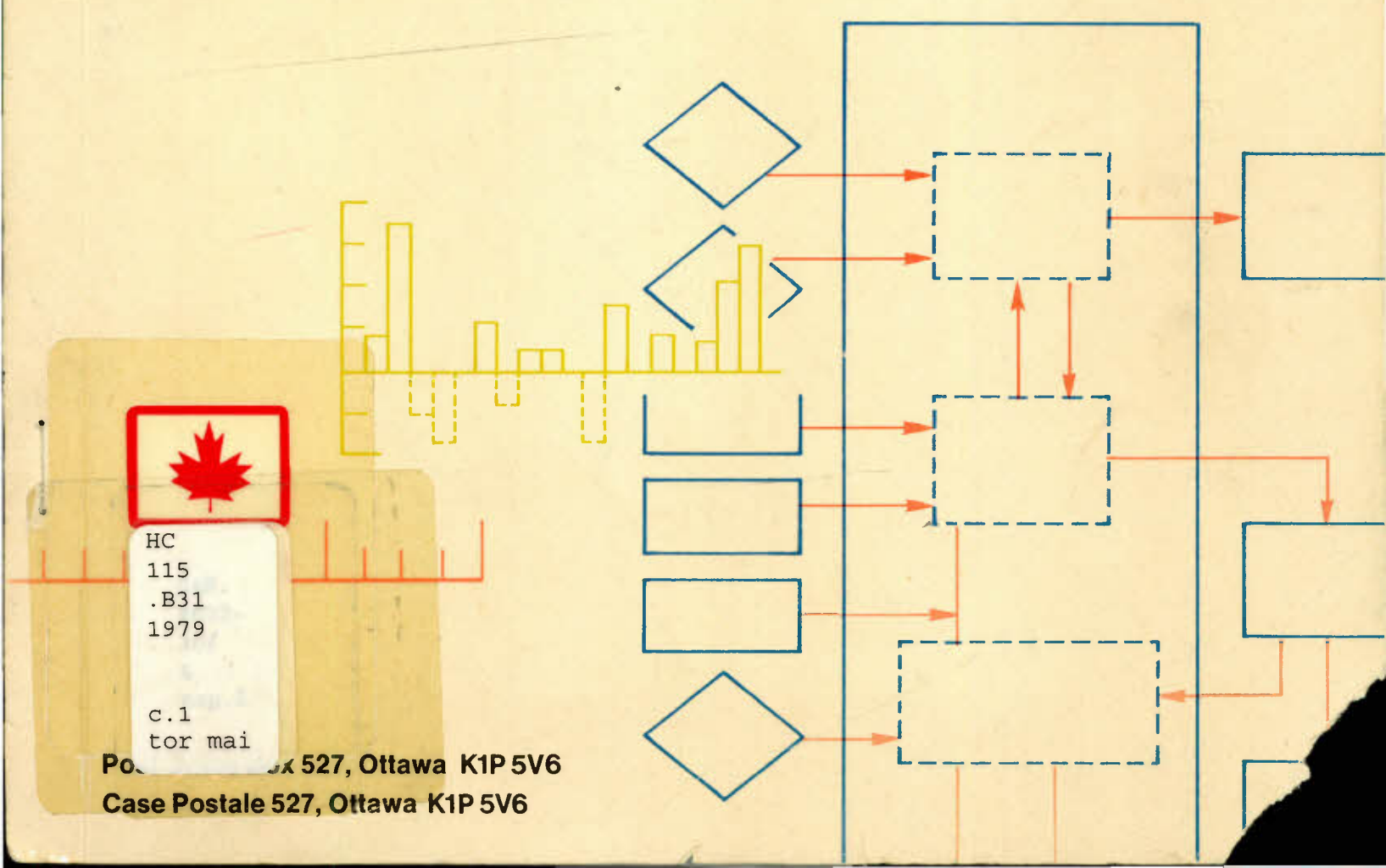

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16TH ANNUAL REVIEW
BACKGROUND SIMULATIONS AND POLICY ALTERNATIVES

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PREFACE

The analysis presented in this document has been developed using the Economic Council of Canada's new version of the CANDIDE Model. In June 1977, research work began at the Economic Council of Canada on a new version of the CANDIDE Model. By October 1978, this new version was in the final stages of testing. Among the many improvements are: structural improvements, a revised data base, refined detail at the sector level (both public and private), and new software techniques to aid in performing policy analysis. For a complete description of CANDIDE Model 2.0, see "CANDIDE 2.0, Model Description," Economic Council of Canada, Ottawa, October 1979.

Individual sector responsibilities are recorded in the document cited above.

This document contains a detailed analysis of 17 simulations performed with CANDIDE Model 2.0. Complete details for any of the solutions are available in the form of a set of computer printouts of 145 tables organized to display all the detail in CANDIDE Model 2.0. Interested parties may obtain any of these printouts from the CANDIDE office of the Economic Council of Canada upon resquest.

TABLE OF CONTENTS

Page

TABLES

SECTION I

I Introduction

In this document, we investigate the economic environment which the Canadian public might face during the next six years. Using CANDIDE Model 2.0, we examine 17 separate projections, each dealing with a specific aspect of the anticipated economic environment.

Prior to a discussion of these simulations, we provide in Section II a detailed statement of assumptions common to all of the simulations. This section includes a discussion of the current state of economic affairs in the United States, France, Germany, the United Kingdom, Italy, and Japan. These OECD countries form the bulk of Canada's major trading partners. We also outline the fiscal and monetary policy framework common to all simulations.

The 17 projections which cover the period 1979 through 1985 fall into four categories. These four groups include the following. (1) Three simulations reported in Section III provide an analysis of the impact on the Canadian economy of domestic energy pricing policies. (2) Four additional simulations reported in Section III examine some of the risks and uncertainties which are less related to energy

pricing policies, but may have an important influence on the economic environment in the medium run. (3) Six simulations reported in Section IV examine the isolated impact of individual monetary and fiscal policies imposed upon an environment in which Canada moves to parity with world crude petroleum prices by 1986. From these solutions, we obtain interesting evidence concerning many of the trade-offs which exist between important aggregates such as growth in GNE, inflation, unemployment and the federal budget position. (4) Four simulations reported in Section V combine the specific individual policies described in Section IV into policy packages in an environment where Canada moves to parity with world crude petroleum prices by 1986. These policy packages range from highly stimulative to restraint.

None of these simulations should be viewed as a forecast. What is reported in this document is a set of sensitivity experiments concerning crude petroleum prices, risks and uncertainties, the impact of individual policies and the implications of combining various degrees of monetary and fiscal stimulus and restraint on economic indicators such as growth in GNE, inflation, productivity, the unemployment rate, the federal fiscal position, the provincial fiscal position, and the balance of payments.

As you read this document, it is important to keep in mind which solution has been used as the base case when

examining the impacts of an alternative. The assumptions discussed in Section II are common to all simulations reported in this document. The assumptions specific to a particular simulation are discussed in the section dealing directly with the solution in question. For example, in Section III, we discuss three crude petroleum price alternatives. The only difference between these three simulations is in the assumptions concerning the domestic and world price of crude petroleum. Given the current discussions on energy pricing, one might regard the simulation in which Canada reaches world prices by 1986 as the most likely case of the three alternatives considered.

In Section III, we also consider some risks and uncertainties less related to crude petroleum pricing. These include uncertainties concerning labour force participation rates, the personal saving rate, the reaction of income earners to higher crude petroleum prices, and the timing and magnitude of certain large investment projects associated with energy. These four simulations use as a base case the crude petroleum price simulation which assumes Canadian domestic prices reach world parity by 1986. Therefore, common to these simulations are all assumptions discussed in Section II and the specific assumptions (discussed in Section III) associated with the parity by 86 solution.

In Section IV, the six simulations which examine the isolated impacts of selected monetary and fiscal policies also use as a base case the crude petroleum price simulation which assumes world parity is reached by 1986. One of these six simulations deals with the impact of the recently announced mortgage interest and property tax credit.

In Section V, we examine four policy packages, the contents of which include those policies which we have examined individually in Section IV. The base case used for purposes of comparison is the solution in Section IV which includes the assumptions associated with the mortgage interest and property tax credit. This means that the assumptions common to the policy packages reported in Section V include all of those assumptions discussed in Section II, those required if Canada reaches world prices by 1986 (discussed in Section III) and the mortgage interest and property tax credit assumptions (discussed in Section IV). We have purposely laid these simulations out in this fashion so that we can disentangle and lay open for analysis the important aspects of the economic environment which should be considered by policy makers during this difficult period.

SECTION II

II Assumptions Common to All Simulations

This section deals with the assumptions used in this study. The assumptions discussed here are common to all simulations. Assumptions specific to a particular simulation are discussed in the section pertaining to the solution in question.

II A The International Environment

II A.1 The U.S. Economy

Real economic growth has slowed dramatically in the U.S. economy during the first two quarters of 1979. The preliminary estimate of the growth in real gross national product for the second quarter, a decline of 3.3 per cent, indicates that the economy is currently contracting, lending support to the view that one of the longest expansions in the post-war history of the U.S. economy has come to an end.

The current short-term outlook reveals real GNE growth of 1.8 per cent in 1979 and 0.5 per cent in 1980.[1] This projection is consistent with a mild recession beginning in the second quarter and continuing through the fourth quarter of 1979. The major areas of weakness in the economy are

expected to be consumer expenditures, particularly those on durable goods, residential investment, and government expenditures. Preventing the economy from sliding deeper into recession are nonresidential investment and the foreign sector, both of which are expected to remain relatively strong throughout the 1979-80 period.

The most significant factor precipitating the current slowdown in activity is the rate of inflation. In 1978 the U.S. inflation rate accelerated sharply and cut into consumer purchasing power. This decline in real personal income served to reduce the rate of growth of consumer expenditures and further weaken the economy. The recent OPEC price increase and the continued pressure of food prices are expected to exacerbate the U.S. inflation rate. The GNP deflator is expected to increase by 9.1 per cent in 1979 and by 9.3 per cent in 1980. As real growth in the U.S. economy slows, the unemployment rate is expected to increase from its current level in mid-1979 of 5.7 per cent to 7.6 in 1980.

Renewed strength is expected to emerge in the second half of 1980, and 1981 will see a path of moderate, but sustained growth, resulting in 2.9 per cent real growth for the year. This resurgent strength is particularly evident in consumer durable and nondurable expenditures, and in residential investment, as well as in continuing strength

of nonresidential investment. As the economy recovers and growth in productivity picks up, peaking at 1.9 per cent in 1981, the rate of inflation is expected to moderate, dropping from 9.3 per cent in 1980 to 7.6 per cent in 1981. The unemployment rate is expected to continue to increase, reaching a level of 8.2 per cent in 1981.

This short-term outlook contains provisions for a 20 billion dollar reduction in personal and corporate taxes in 1979, and assumes that a tax cut of a similar size, $22.0 billion, will be implemented in the following year. The increase in the social security tax rate, currently scheduled for 1981, has been postponed in the Wharton solution until 1982 due to continued concern over inflation, and the projected weakness of the economy in 1981. The energy assumptions allow for the decontrol of domestic crude petroleum prices by October 1, 1981 and for the deregulation of domestic natural gas prices by 1985. The provisions of President Carter's July 15, 1979 energy proposals were not incorporated in this solution, but have been analyzed by Wharton in two alternatives.

During the 1981-85 period, real growth in the U.S. economy is expected to average 2.9 per cent. This growth, which is predicated on fairly vigorous nonresidential investment activity, is significantly lower than the 3.7 per cent per annum recorded in the 1956-73 period. The expected

decline in the longer-term growth rate is largely the result of a decline in the growth of the labour force and of a more modest expansion of labour productivity than occurred in the 1950's and 1960's. The average rate of productivity growth in all industries is 1.4 per cent compared with 2.1 per cent during the 1956-73 period. Although the rate of inflation is expected to moderate in 1981, the assumed increase in the social security tax rate in 1982, in addition to the persistence of high energy prices, tend to maintain the inflation rate in the range of 7.7 to 6.4 per cent through 1985. A slower overall growth of the labour force in the 1980's coupled with the continued expansion of the economy results in a gradual decline in the unemployment rate from a high of over 8.2 per cent in 1981 to 7.3 in 1985.

In the current Wharton projection, the share of consumer expenditures falls somewhat from 64.1 per cent in 1979 to 63.4 in 1985. Real government purchases of goods and services are projected to decline more sharply from 19.7 per cent in 1979 to 18.5 per cent in 1985. This decline is consistent with current public sentiments in the United States to reduce the size and influence of government in the economy. Since the share of the foreign sector, as expressed by net exports, also declines slightly, the expenditure category which offsets the declining share of government expenditures is gross private domestic investment which increases from 14.9 per cent in 1979 to 16.6 per cent in 1985.

Table 2-1

Selected Major U.S. Indicators
Wharton Annual Model, July 18, 1979 Post-Meeting
Control Solution

(Average Annual Percentage Change)

	1978-81	1981-85
Real GNP	1.7	2.9
GNP Deflator	8.6	6.9
Nominal GNP	10.5	10.0
Real Consumption	1.4	2.7
Durables	0.9	2.6
Nondurables	0.3	2.1
Services	2.4	3.4
Total Real Investment	2.9	4.3
Nonresidential	6.8	3.5
Residential	-2.5	3.0
Real Trade Flows		
Imports	3.1	3.7
Exports	7.1	3.3
Real Government Spending	0.4	2.1
Federal	1.1	2.1
State & Local	0.04	2.2
Industrial Detail		
Mining	3.4	0.3
Manufacturing	3.5	3.4
Durables	4.3	3.1
Nondurables	2.3	3.7
Utilities	4.9	2.7
Employment	1.3	1.5
Civilian Labour Force	2.1	1.2

Source: Wharton Annual and Industry Forecasting Model, July 18, 1979 Post-Meeting Control Solution.

This characteristic of the longer-term outlook, a declining share of government expenditures and an increasing share of gross private domestic investment, is an important factor underlying the long-term growth of labour productivity in the current projection. For a summary of the U.S. assumptions, see Table 2-1.

II A.2 Other Major OECD Countries

Projections for indicators of industrial production, inflation trends, exchange rates and prices are made at varying levels of detail for five other OECD countries, France, Germany, United Kingdom, Italy and Japan. The economic trends of these countries, which account for a large percentage of Canadian 'rest of the world' trade, are used in most instances as proxies for overseas growth. In several specific areas of activity, among them investment and consumption, projections are also made for these aggregate indicators.

The latter assumptions will be discussed after we briefly review the economies of the five countries listed above and the projections specifically associated with these countries. The major indicators are listed in Table 2-2.

France

Recent trends in France have indicated a continuation of only moderate growth in domestic demand with

persistently high price levels, and slackening of growth in industrial production resulting in a rise in unemployment. Further appreciable pressures will develop on raw material prices and on unit labour costs as workers attempt to recoup the increased social security contributions legislated in early 1979.

Steady growth is expected in final domestic demand, with some weakness resulting from a further acceleration in inflation due to crude petroleum prices and a risk of the resurgence of increased inflationary expectations. A number of measures to stimulate private investment, particularly tax incentives, are expected to give a positive lift to private investment. The level of growth is not expected to be sufficient to ameliorate continued labour market pressures, and measures designed to stimulate job creation, especially in certain sectors of the economy, are abundant. The labour market situation may have a moderating influence on wage demands.

Industrial production in France is expected gradually to stabilize in the long run near a 4.0 per cent per annum level of growth, a full 2 percentage points lower than performance in the 1955-74 period. The franc is assumed to further appreciate in 1980 relative to the Canadian dollar, and to then stabilize.

Germany

Expansionary fiscal policy stemming from the Bonn commitment has been accompanied by an expansion of demand and output of sufficient strength to raise capacity utilisation rates and profits and to improve the unemployment picture in the past year. While some decline in government expenditure is expected once the Bonn measures are implemented, continued strength in domestic demand resulting from consumer spending and exports, as well as investment activity, is projected.

Fairly strong inflationary pressures arising from price increases in crude petroleum and other commodities are expected to exert a downward influence on demand and output. Strong demand for residential construction is constrained by supply bottlenecks such as shortages of skilled labour and technical capacity. As productivity trends continue to marginally decrease, some labour market slack can be expected depending on the behaviour of participation rates and the net migration of foreign workers.

Some deterioration in the terms of trade stemming from commodity price increases will result in a reduction of the current account surplus, despite expectations of continued strength in both import and export volumes.

In our projections for the German economy the short-term rate of growth in industrial production is projected to weaken due to inflationary pressures, and to then resume a path close to more recent trends, but lower than the rates of growth achieved in the 1955-74 period. Present inflationary pressures are expected to moderate somewhat towards the end of the projection period, and the mark is assumed to stabilize after a further appreciation in 1980.

United Kingdom

Strikes and weather conditions have seriously undermined the rapid growth of domestic demand and output that had been present in the U.K. economy until the third quarter of 1978 (the rate of growth of final domestic demand, over the previous half-year, fell from 5.1 per cent in the first half of 1978 to 2.7 per cent in the last half). Services output and activity in the sectors involving North Sea oil recovery remain the only buoyant elements as investment, consumption, and foreign trade patterns are distorted by strike and other erratic factors. Some recovery has been seen in manufacturing production, but is muted by inflationary pressures resulting from considerable increases in average earnings and from rising crude petroleum and other commodity prices.

The measures announced by the Thatcher government in the June budget are expected to have a contractionary effect on activity for the next year, and the increase in value-added taxes is expected to intensify inflationary pressures, thus exerting a negative influence on consumer spending.

Estimates and analysis of longer-term growth trends in the U.K. economy are hazardous, given the uncertainty as to the outcome of present policies. Industrial production is projected to increase at only 1.5 per cent in 1979 and 2.4 per cent in 1980. With the expected recovery and the stimulus effected by North Sea Oil activity, the growth rate then returns to an annual increase close to the average of the 50's and 60's.

Deterioration in the balance of payments intensified by a decline in the terms of trade is expected to result in some depreciation of the pound, though it is assumed to stabilize in the long run under the influence of the European Monetary Union.

Italy

A strong recovery in the last half of 1978 with an exceptional increase in industrial production (25 per cent in the fourth quarter) is continuing in 1979 with ongoing

strength in activity, particularly private nonresidential investment. In line with their three-year recovery plan, government efforts to shift their spending from current to investment expenditure have not yet resulted in the anticipated gains. Cautious monetary policy is expected to play an accommodating role in the recovery of activity. Some moderation in growth may manifest itself in the face of increasing price pressures resulting from crude petroleum prices and resultant upward pressure on wages.

The level of unemployment is expected to remain high, particularly in the secondary labour force which is impacted by the habitual re-entry of 'discouraged workers' during expansionary periods. Production has increased faster than employment, effecting an increase in productivity. Further growth is expected to arise from these productivity gains rather than from increases in employment.

The deterioration in the lira is expected to be shortlived. Continued strength is evidenced in the current account balance arising from tourist receipts. We assume that the lira will stabilize after a small appreciation in 1980.

Growth in Italian industrial production is expected to moderate somewhat, influenced by inflationary

pressures, and averages a rate of growth of just over 4.5 per cent per annum during the projection period.

Japan

The expansionary fiscal policy which stimulated domestic demand in 1978 is expected to exert only a limited stimulus in 1979 and 1980. A gradual restoration of business confidence and a steady rise in capacity utilisation has led to expectations of the development of moderate strength during the early part of the projection period in business investment, particularly in the large manufacturing sector. A resurgence of inflationary pressures resulting from the rise in crude petroleum prices, as well as in other commodity prices, will tend to exert a moderating influence on consumer expenditure.

Despite improved competitiveness of exports due to the recent depreciation of the yen in the late spring of 1979, the substantial increase in the oil account will effect a decline in the terms of trade and lead to some deterioration in the current account surplus. The yen is assumed to remain relatively stable throughout the forecast period.

Due to the impact of inflationary pressures, Japanese industrial production is forecast to grow at

4.5 per cent in 1979 and 4.0 per cent in 1980. It will then gradually recover to a level slightly higher than that achieved in 1978. This moderate rate of production, when compared to the double-digit performance in the 1955-74 period, is predicated on considerations of energy supply constraints and continued inflationary pressures.

Other Overseas Aggregates

The rate of growth of overseas consumption expenditure is obtained from a stochastic equation relating it to aggregate overseas industrial production, the individual components of which we have just discussed. The indexes of the volume and price of overseas gross fixed capital formation are trade weighted averages of the individual rates of growth assumed for each of the five countries. The OECD Europe countries are assigned a weight of .60 in the aggregate while Japan is assigned a weight of .40. The scenario for investment in the majority of the countries is one of moderate strength, particularly in nonresidential investment, with strong inflationary pressures in the United Kingdom, Italy, and France.

Overseas newsprint capacity and demand are assumed to grow at an average annual rate of 4.5 and 5.0 per cent respectively. Overseas markets other than our representative countries account for over 60 per cent of our overseas newsprint

trade, so these capacity and demand figures are postulated on expectations of constant growth in markets for newsprint, particularly in third world markets.

Summary

The scenario developed in the overseas assumptions is one of inflationary pressures developing from higher crude petroleum prices, as well as non-oil commodity prices, and of moderate growth that is weakened in the near term by these price effects. However, the downswing in economic activity apparent in the United States is not nearly as apparent in the overseas economies, and they maintain moderate rates of growth, though low if judged by the standards of the 1950's and 1960's. OECD growth in industrial production, excluding Canada, is projected at 1.3 per cent in 1980.

European exchange rates are expected to stabilize under the influence of the European Monetary Union, and this will transmit a stabilizing influence on the Japanese yen. Interest rates, as expressed by the United Kingdom consols rate, are assumed to remain high, creating an investment climate for the area conducive to capital inflows.

For a summary of assumptions pertaining to foreign economies other than the United States, see Table 2-2.

Table 2-2

Selected Overseas Indicators

(Annual Average Percentage Change Except Otherwise Stated)

	1979	1980	1981	1982	1983	1984	1985
Industrial Production							
- France	3.7	3.5	3.8	4.2	4.5	4.3	4.0
- Germany	4.0	3.8	3.5	4.0	4.5	4.3	4.0
- Italy	4.8	4.0	4.0	4.3	4.6	5.0	4.5
- United Kingdom	1.5	2.4	3.0	2.8	2.9	2.7	2.8
- Japan	4.5	4.0	5.1	5.6	6.2	6.5	6.5
Trade Weighted Average[1]	3.7	3.6	4.2	4.5	5.0	5.1	5.0
Consumer Prices							
- Germany	3.8	4.2	4.0	3.5	2.8	3.0	2.6
- United Kingdom	9.5	10.0	9.0	8.5	8.0	7.5	7.8
Exchange Rates[2]							
- France	0.2675	0.2800	0.2800	0.2800	0.2800	0.2800	0.2800
- Germany	0.6150	0.6200	0.6200	0.6200	0.6200	0.6200	0.6200
- Italy	0.00136	0.00140	0.00140	0.00140	0.00140	0.00140	0.00140
- United Kingdom	2.380	2.350	2.350	2.350	2.350	2.350	2.350
- Japan	0.00545	0.00550	0.00550	0.00550	0.00550	0.00550	0.00550
Traded Weighted Index[3]	1.5441	1.5575	1.5575	1.5575	1.5575	1.5575	1.5575
Overseas Aggregates							
- Gross Fixed Capital Formation	4.3	3.7	4.7	6.0	6.6	7.1	6.4
Deflator	6.1	5.6	5.4	5.5	5.5	6.0	5.8
- Consumption	4.1	4.0	4.8	5.0	5.6	5.9	6.0

1 Trade weighted by total trade (exports plus imports). Sum of the five country areas is used as proxy for total overseas trade (these countries plus the U.S. account for over 85 per cent of Canadian trade). Weights are: France .0874, Germany .1548, U.K. .2741, Italy .0769, and Japan .4068.

2 Cross rate between local currency and Canadian dollar.

3 Trade-weighted exchange rate expressed in terms of Canadian dollars on index base, 1971 = 1.000.

Source: Projections taken from Organisation for Economic Co-operation and Development OECD Economic Outlook, July 1979; National Institute of Economic and Social Research, National Institute Economic Review, No. 89, August 1979; and the Japan Economic Research Center, Quarterly Forecast of Japan's Economy, No. 42, July 1979.

II A.3 International Trade of Non Crude Petroleum and Gas Commodities: Exogenous Volumes and Prices

Volumes

A number of trade flows which are either policy determined or are of a highly volatile nature are determined exogenously in CANDIDE Model 2.0.

Exports of uranium are projected to increase at high rates of growth, reflecting a continuation of present trends. Electric power exports continue to increase at a rate of 20.0 per cent per annum incorporating an assumption of strong export demand reinforced by projections of excess capacity in the electric utilities. Exports of coal, a large percentage of which go to Japan, are projected to weaken somewhat from the previous high rates of growth, but to then steadily recover, ranging from 5.0 per cent in 1979 to 7.5 per cent by 1985. Imports of coal, most of which come from the United States, are expected to continue their decline, though at a somewhat reduced rate.

Our projection for exports of wheat and other grains has been modified by considerations of transportation constraints within Canada. However, the forecasted rate of growth is strong and is based on an optimistic assumption of reasonable crop returns over the period.

Prices

In general, our projections of import and export prices imply increased price pressures in the short run, particularly in commodities or in areas that are related to energy intensive processes, with a gradual easing of these international inflationary pressures towards the end of the projection period in most commodities.

Turning to the area of energy-related prices other than those to be discussed in Section III, the export prices for uranium and electric power are projected to remain strong, increasing at growth rates which reflect the general environment of "high-priced" energy. Similarly, the import and export prices for coal exhibit increasingly strong rates of growth towards the end of the projection period.

Export prices for minerals are projected to continue their present recovery, particularly in the area of copper and iron ores, and copper and alloys, and to then remain well over the 6 per cent per annum range. Similar strength is expected in the import price of nonferrous metals, an import category of which aluminum is a large part.

The decline over the past two years in export prices of pulp appears to be at an end, and they are expected to gradually return to their previous strength

after stabilizing in the current year. Wood and lumber prices have increased dramatically over the past two years, and the export price is projected to exhibit a similar rate of growth (12 per cent in terms of $U.S.) in 1979, after which it is projected to remain strong but gradually decline to the range of 6.0 per cent per annum by the end of the projection period. While similar strength has been exhibited in import prices of wood and lumber products, the composition of the category dictates a somewhat more moderate projection.

While some moderation is expected in food prices, both export and import prices of the various food categories remain high in 1979 with some easing of the pressures further into the projection period. The only area where this does not apply is in the case of the export prices for alcoholic beverages and tobacco where price increases are anticipated to continue to be modest.

Within the large area of farm and industrial machinery and transportation equipment, our price projections reflect moderate inflationary pressures with some easing towards the end of period in the case of machinery. The import deflator for communications equipment has shown modest price increases in past years and is expected to continue this trend.

Price projections for the four trade services categories -- freight and shipping, travel expenditures, income flows, and other services -- exhibit considerable strength in the areas that reflect transportation costs, which are expected to run moderately high throughout the period. The deflators for income receipts and payments generally reflect movements in overall trade prices, although the payments deflator tends to run at more modest rates of growth than the aggregate import deflator.

II B Government Expenditures

II B.1 Current Expenditures on Goods and Services

In recent years, we have witnessed an increasing concern about the growth of government spending, about the size of the federal deficit and about the fiscal position of many provinces. The federal government has expressed its firm intention to keep expenditure under tight control and to keep growth in federal spending well below that of growth in GNE. We have looked carefully at our exogenous assumptions and endogenously generated government expenditures, to be sure that the projections in this area are in accordance with announced government policy. If we found that the endogenously generated results do not conform to policy, we adjusted the projections so as to satisfy the requirements of government restraint. The adjustments are discussed below.

Table 2-3

Federal Government Current Expenditure - Constant Dollars

(Average Annual Percentage Change)

	1973-79	1979-85
Total	3.6	2.1
Goods & Services	3.6	2.2
Defence	4.2	2.6
Military Pay & Allowances	0	1.8
Capital Expenditure	8.0	3.8
Civilian Wages & Salaries	1.1	2.6
Other Expenditure	9.3	3.2
Nondefence	3.2	1.9
Wages and Salaries	3.2	2.0
Other Expenditure	3.2	1.9
Capital Consumption Allowance	3.9	1.0
Real GNE	3.2	3.5

Source: 1973-78 - Statistics Canada, National Income and Expenditure Accounts.
1979-85 - CANDIDE Solution, Parity by 86.

Table 2-3 contains average growth rates of federal real current expenditure for the 1979-85 period. For comparison's sake we also show the growth rates for the 1973-79 period and the growth rate of real GNE.

As Table 2-3 indicates, we have restricted federal real current expenditures to a growth rate 1.4 per cent lower than that of real GNE. Real military pay and allowances and real defence civilian wages and salaries reflect the number of persons employed, and here we have permitted a modest increase above the extremely low growth rates of the preceding six years. We have constrained non-defence employment to a growth rate of 1.9 per cent, well

below the anticipated 2.2 per cent growth rate of total employment in the economy. Other nondefence expenditure increases are in line with nondefence employment growth. The growth of capital consumption allowance reflects the extremely low growth in federal investment which is discussed in a latter section.

Besides the volume of goods and services purchased by the federal government, expenditures are also influenced by the price of these goods and services. The most important price is that of wages and salaries, or in other words the average federal wage rate. Here too, the government has announced its intention to abide by restraint. Table 2-4 contains the growth rates of the prices corresponding to Table 2-3. For comparison's sake we include the GNE deflator and the average wage rate for the economy.

Table 2-4

Federal Government Current Expenditure Deflators

(Average Annual Percentage Change)

	1973-79	1979-85
Total	9.6	8.1
Goods & Services	9.5	8.0
Defence	8.4	8.0
Military Pay & Allowances	8.5	10.6
Capital Expenditure	9.9	7.4
Civilian Wages & Salaries	10.5	8.1
Other Expenditure	8.3	5.9
Nondefence	10.2	8.0
Wages and Salaries	10.5	8.7
Other Expenditure	9.3	6.2
Capital Consumption Allowance	11.5	10.2
Average Wage Rate, Total Economy	11.4	10.1
GNE Deflator	9.6	7.8

Source: 1973-78 - Statistics Canada, National Income and Expenditure Accounts.
1979-85 - CANDIDE Solution, Parity by 86

Table 2-4 indicates that we have restricted the growth of federal wages below that of the economy-wide average. The only exception is that of the military. The growth rate of military pay and allowances has fallen well behind that of the average wage rate during the last six years. In view of the planned increase of the armed forces we consider it a more reasonable working assumption to accelerate their growth relative to past experience. We expect that the government austerity program will make every effort to keep the price increase of non-wage expenditure below past experience and well below the projected growth of the GNE deflator.

Table 2-5 indicates that we have applied the real growth rate of the federal nondefence current expenditure on goods and services to the provincial governments.

Table 2-6 indicates that we assume the provincial governments also exert restraint in the granting of wage increases, even if not as severely as does the federal government. Our solutions indicate that the budget position of the provincial governments as a whole is better than that of the federal government, therefore they may display slightly more flexibility on the question of wage increases.

Table 2-5

Provincial Government Current Expenditure - Constant Dollars

(Average Annual Percentage Change)

	1973-79	1979-85
Total	4.1	1.9
Goods and Services	4.0	1.9
Wages and Salaries	1.8	1.8
Medicare	4.3	2.3
Other Expenditure	11.9	1.7
Capital Consumption Allowance	5.0	1.4
Real GNE	3.2	3.5

Source: 1973-78 - Statistics Canada, National Income and Expenditure Accounts.
1979-85 - CANDIDE Solution, Parity by 86.

Table 2-6

Provincial Government Current Expenditure Deflators

(Average Annual Percentage Change)

	1973-79	1979-85
Total	11.8	9.0
Goods and Services	11.8	8.8
Wages and Salaries	14.5	8.7
Medicare	7.5	8.4
Other Expenditure	9.3	6.2
Capital Consumption Allowance	11.5	10.2
Average Wage Rate, Total Economy	11.4	10.1
GNE Deflator	9.6	7.8

Source: 1973-78 - Statistics Canada, National Income and Expenditure Accounts.
1979-85 - CANDIDE Solution, Parity by 86.

Table 2-7

Local Government Current Expenditure - Constant Dollars

(Average Annual Percentage Change)

	1973-79	1979-85
Total	0.7	1.1
Goods and Services	0.3	0.9
Wages and Salaries, Schools	-1.0	-0.5
Wages and Salaries, Other	3.0	2.1
Other Expenditure	-0.3	2.1
Capital Consumption Allowance	3.8	2.4
Real GNE	3.2	3.5

Source: 1973-78 - Statistics Canada, National Income and Expenditure Accounts.
1979-85 - CANDIDE Solution, Parity by 86.

Tables 2-7 and 2-8 contain the data on local governments.

Current expenditures of local governments on items other than real school wages and salaries (i.e. employment, in schools) are assumed to grow at 2.1 per cent. Real expenditure on school wages slowly declines until 1982, then levels off, even though school enrolment continues to decline. This combination permits a slightly improved teacher-pupil ratio.

Table 2-8 indicates that local wages and salaries grew faster than the national average during the 1973-79 period, school salaries in particular. For the next six years we assume local salaries to grow about 1.5 per cent slower than the national average.

Table 2-9 indicates continued restraint in real hospital expenditures.

Table 2-10 shows that we assume hospital wage rates and the price of other current expenditures to increase in line with the national wage rate.

Table 2-8

Local Government Current Expenditure Deflators

(Average Annual Percentage Change)

	1973-79	1979-85
Goods and Services	13.5	8.0
Wages and Salaries, Schools	15.2	8.6
Wages and Salaries, Other	12.9	8.4
Other Expenditure	9.3	6.2
Capital Consumption Allowance	11.5	10.2
Average Wage Rate, Total Economy	11.4	10.1
GNE Deflator	9.6	7.8

Source: 1973-78 - Statistics Canada, National Income and Expenditure Accounts.
1979-85 - CANDIDE Solution, Parity by 86.

Table 2-9

Hospital Current Expenditure - Constant Dollars

(Average Annual Percentage Change)

	1973-79	1979-85
Total	1.1	1.0
Goods and Services	1.1	1.0
Wages and Salaries	2.1	1.0
Other Expenditure	-4.8	1.0
Capital Consumption Allowance	1.1	1.0
Real GNE	3.2	3.5

Source: 1973-78 - Statistics Canada, National Income and Expenditure Accounts.
1979-85 - CANDIDE Solution, Parity by 86.

Table 2-10

Hospital Current Expenditure Deflator

(Average Annual Percentage Change)

	1973-79	1979-85
Total	14.3	10.0
Goods and Services	14.4	10.0
Wages and Salaries	14.9	10.0
Other Expenditure	9.0	10.0
Capital Consumption Allowance	11.5	10.2
Average Wage Rate, Total Economy	11.4	10.1
GNE Deflator	9.6	7.8

Source: 1973-78 - Statistics Canada, National Income and Expenditure Accounts.
1979-85 - CANDIDE Solution, Parity by 86.

II C Government Capital Formation

In keeping with the restraint program of the various levels of government, a few minor downward adjustments based on judgement were made to selected real government investment items. Federal investment in other engineering construction was adjusted downward by $5 million (or about 4 per cent) in 1980 and the adjustment left unchanged for the rest of the projection period. Similarly, provincial highway construction was adjusted downward by $50 million (or about 5 per cent) and provincial buildings by $30 million in 1980 and the adjustment left unchanged thereafter. Local government construction investment in schools was reduced by $25 million in 1980, and by $75 million thereafter to keep school construction more in line with declining enrolment.

II D Transfer Payments to Persons

Except for a few residual categories, transfer payments to the personal sector are determined endogenously. Payments made by the federal government and the Canada/Quebec Pension plan are determined by the current legislation governing the rate of payment to a specific type of beneficiary and by a projection of the total number of recipients of each category of benefit. At the provincial and local level, the detailed identification of the rate and base for

each type of benefit (welfare, workmen's compensation, education, and government pensions) is not used, and, instead, a suitable endogenous forecasting relationship has been used.

In those cases where a suitable rate and base have been identified, it is possible to incorporate indexing as well as current changes to the acts governing the method of payment. Although the annual benefit rates for family allowances and guaranteed income supplement recipients are indexed, the indexation has been overridden for 1979 to incorporate changes to the base rates to which the indexation rule is applied. Recently, the unemployment insurance benefit rate has been changed from 66 to 60 per cent of insurable earnings. This ruling has been incorporated in the projection.

The number of recipients of Canada/Quebec Pension plan benefits, family allowances, old age security and veterans benefits are determined by demographic considerations. Labour market conditions determine the number of unemployment insurance beneficiaries and the number of contributors to the unemployment insurance and the Canada/Quebec Pension Plan.

For each category of transfer payment requiring indexation, there is a separate endogenously determined indexation rule.

II E Current Transfers to Other Levels of Government

The four categories of federal transfer payments to the provincial governments are: taxation (equalization) agreements, Canada Assistance Plan, established programs (hospital insurance, medicare, education), and a miscellaneous category. Except for the Canada Assistance Plan, these transfers are exogenous in the projection period.

Payments made under the Canada Assistance Plan are related to provincial welfare payments; they are about 30 per cent of the provincial expenditure. The miscellaneous category is exogenous and is projected by an 8 per cent growth rule. The transfer for taxation agreements is related to personal income per capita. A projection was made on this basis and the results were adjusted to reflect the recent large increases in natural resource revenues. That is, about 40 per cent of the increase in provincial royalty revenue attributable to the recent and projected crude petroleum price increases was added to the results obtained from the per capita income equation.

A separate calculation, which approximates current legislation, is made to obtain spending on established programs. This calculation uses the model's projection of basic federal income tax, the rate of growth of nominal GNE,

and the 1975 base expenditure of this program to arrive at expenditures for the projection period. We assume that the existing legislation continues beyond 1982 to 1985.

Provincial transfers to local government and to hospitals are endogenous. The transfer to hospitals meets the cash requirements of this sector (other revenues are negligible). For local governments, most of the difference between next year's projected total expenditures and property tax receipts is met by a transfer from the provinces. It is anticipated that local governments will not run deficits on current accounts.

II F Interest on the Public Debt

We remind the reader that in CANDIDE Model 2.0, the deficits of each level of government are financed by issuing government paper (money or bonds) to the central bank or in financial markets. Thus the stock of debt and the corresponding interest payments for each level of government are endogenous.

Cash requirements of the federal government, as defined by the National Accounts, are generated by the federal deficit, additional direct loans to crown corporations and government agencies (those not included in the National Accounts definition of government), and the need to

finance the exchange fund. The amount of treasury bills, Canada savings bonds and long-term bonds used to meet the government cash requirement is determined endogenously. These equations depend, among other things, upon the level and composition of the debt already issued and on the interest cost of each instrument.

II G Government Revenues

The main revenue categories are personal taxes, unemployment insurance fund contributions, corporation taxes, sales and other indirect taxes, and investment income. In all cases, the current legislation was assumed unchanged during the entire projection period.

II G.1 Personal Direct Taxes

The personal income tax model separates revenues into federal, Quebec, and other provincial accruals. The tax brackets and personal exemptions in the tax calculation for federal and other provincial governments are indexed according to statute. An adjustment to the exemption functions was made to account for the impact of the new family allowance program. The federal tax reduction, $200 minimum - $500 maximum, was maintained throughout the projection period.

II G.2 Corporate Direct Taxes

At each level of government, corporate taxes are determined by multiplying an effective tax rate by taxable corporate profits. The effective tax rate used in the projection period remains unchanged from the 1978-79 level.

Corporate Income Tax Rates -- Industry Level

Since 1976 there have been no major changes in the federal corporate income tax rate and the federal tax abatement rate, and only negligible changes in the provincial corporate income tax rates. Consequently, the industry corporate tax rates remained unchanged in each of the years 1979 to 1985.

Investment Tax Credit

In November 1978, increased investment tax credit rates for certain regions were announced. Also announced was an extention of coverage to machinery and equipment in transportation for the investment tax credit. Both changes have been incorporated into the effective tax credit rates developed for 1979. Since the credit was extended indefinitely, the 1979 effective tax credit rates for the appropriate industries are extended to 1985.

Except in the case of machinery and equipment in the transportation industry, the 1979 effective tax credit rates were obtained by first constructing weighted average statutory tax credit rates for the primary and manufacturing industries separately. These were constructed by using as the 1979 weights for each of these industries, the 1978 ratio of the industry's total investment in each tax credit region to the industry's total investment, and the statutory tax credit rates applicable to each of the three regions. Once the weighted average statutory tax credit rates were obtained they were multiplied in every case by .80. This was done on the assumption that, given the regulatory limits placed on earning the investment tax credit, the effective rates are not likely to exceed 80 per cent of the weighted average statutory tax credit rates.

The effective tax credit rate for machinery and equipment in the transportation industry was obtained simply by multiplying the basic tax credit rate of 7 per cent by .80.

It should also be noted that our effective tax credit rates do not account for the tax credit which might be earned on certain additional expenditures (research and development). Nor has the effective tax rate developed for agriculture, fishing and trapping been adjusted to allow for the fact that the passenger and commercial vehicles in agriculture are exempt from the investment tax credit.

Tax Depreciation Rules and Rates

All the tax depreciation rules and rates which were applicable in 1979 have been pushed forward to 1985.

The November 16, 1978 Budget extended indefinitely the two-year write-off for pollution control equipment. The impact of this extension has not been incorporated into our assumptions. This impact would be felt in the pulp and paper industry and the mining industry, but in the first of these industries accelerated depreciation is already in use for machinery and equipment, and in both industries expenditures on pollution control equipment are a small proportion of total expenditures.

Similarly, two measures which became effective April 10, 1978, an additional depreciation allowance of 6 per cent per year for most capital expenditures on railways and the allowance of accelerated (50 per cent) depreciation and a 40 per cent tax rate for upgrading plants which process heavy oil into conventional type crude oil, have been incorporated into our assumptions.

Even though these two measures have been announced, neither had been incorporated into the Income Tax Regulations at the time the reference solution was developed.

Consequently, their incorporation was felt unjustified. For this same reason, two additional measures, the reduction of depreciation on woodframe buildings from 10 to 5 per cent which should have been effective January 1, 1979, and the increase in the write-off for development expenditures in mining from 30 to 100 per cent, have not been included in our assumptions.

Even if all of the above measures had been incorporated into the Income Tax Regulations it is not likely that they would have been reflected in our tax depreciation rules and rates during the period 1980-85. This is so because we use the most commonly applied rule and its associated rate for each investment category in a given industry. Thus, new depreciation rules are not likely to become most likely rules until they have been in existence for several years.

II G.3 Indirect Taxes

The federal manufacturers' sales tax has been set at 9 per cent for the projection period. Other indirect taxes use rate and base definitions appropriate to the 1978 period for the 1979-85 period. Real property taxes are determined by a behavioural equation.

II G.4 Investment Income

Investment income consists of remitted profits of government enterprises, interest income and royalties. With the exception of royalties, these are determined endogenously. Remitted profits are a function of the profits of government enterprises. Interest income is a function of long-term interest rates and nominal GNE, which is used as a surrogate for the size of the government-held stock of assets.

Federal royalty income is exogenously projected and runs close to one million dollars throughout the period. Royalties on production of crude petroleum and natural gas from arctic regions are included in this item. Since no production is expected to come on stream during the projection period, this source of revenue is not significant.

For provincial governments, the investment income breakdown is similar to the federal breakdown. Remittances from government corporations and provincial interest income are handled in a similar fashion to the federal items discussed above. Provincial royalty income is exogenously projected, and the methods employed in the determination of this income source are discussed in Section III.

II H Monetary Policy

Since the autumn of 1975, the Bank of Canada has directed its policy towards maintaining a rate of monetary growth (currency plus demand deposits) sufficient to accomodate a reasonable amount of real economic growth accompanied by declining inflation rates.

As seen from Table 2-11, the Bank of Canada has gradually reduced its monetary growth target range over time -- the growth target range for M1 declines from 10-15 per cent in 1975 to 6-10 per cent in 1978. In all four years, the Bank of Canada has been successful in keeping monetary growth within the target range. In spite of high interest rates in 1978, the Bank has had difficulty in keeping within the target range.

In developing our simulations for 1979-85, we have kept the money supply growth at 9 per cent per annum. The few exceptions to this are explicitly mentioned later. Of course, our assumed growth rate is close to the upper bound of the monetary target announced by the Bank of Canada. Here we are implicitly assuming that the Bank of Canada will be under heavy pressure to accomodate the increased transaction demand for money resulting from higher energy prices, unless it intends to raise interest rates well above their present high levels.

Table 2-11

Growth of Money Supply (M1)

(per cent)

	Actual	Target Range
1975	13.8	10-15
1976	8.0	8-12
1977	8.3	8-12
1978	10.1	6-10

Source: Bank of Canada Review, April 1979, Table 1.

II I Other Important Factors Influencing the Simulations

While the specification of the endogenous equations represents our best judgment of the forces influencing the various economic indicators, we do not hesitate to treat them as exogenous and to use alternative data when in our opinion we had additional information. In particular, we attempted to incorporate additional information by exogenizing the following endogenous variables:

a) immigration policy (we assumed net immigration of 35 thousand persons in 1979 and 1980, 50 thousand thereafter);
b) the effect of government expenditure restraint, as described in Sections II B and II C; and
c) a monetary growth target of 9 per cent per annum for the narrowly defined money supply (M1), as described in Section II H.

SECTION III

III The Influence of Domestic Oil Price Adjustment in a Common Monetary and Fiscal Policy Framework

In Section II, a detailed outline of the assumptions common to all simulations discussed in this document is presented. In this section, we study the impact of domestic crude petroleum price adjustment in an environment free from any new policy initiatives. We first indicate the reasons for examining the impact of different assumptions concerning the speed with which Canada approaches world crude petroleum prices. We then give a detailed outline of the specific assumptions relating to domestic crude petroleum price adjustment in each of three solutions used to investigate this impact. Thirdly, we provide an analysis for a selected set of economic indicators for each of the three crude petroleum price adjustment simulations. Fourth, we examine some risks and uncertainties that may arise during the projection period.

The persistence and acceleration of the rate of inflation has been a dominant characteristic of the Canadian economy during the 1970's. In the decade about to pass, the rate of inflation as measured by the consumer price index has averaged 7.5 per cent per year. This far exceeds the average rate of 2.5 per cent per year recorded in the 1960's. It is unlikely that the rate of inflation will fall much below the

8 per cent mark in the early part of the next decade. Inflationary expectations are firmly entrenched in Canada. They will only fade away slowly.

As evidence of this, during 1979, OPEC crude petroleum price increases have again become an important factor in formulating expectations about inflation. World crude petroleum prices are now 45 per cent higher than they were in December 1978. The impact of the recent OPEC price increase on the North American economy will be significant. Energy is an important input in the production process. Increases in crude petroleum prices are transmitted at each stage of production until they reach the retail level. They also enter at the retail level directly (home heating oil, motor fuel, and natural gas). Moreover, secondary effects are borne through the wage price mechanism as wage earners react to higher prices through increased wage demands.

The future path of Canadian crude petroleum and natural gas prices will be strongly influenced by both the behaviour of world crude petroleum prices and those pricing policies deemed appropriate by both Canadian and U.S. authorities. Canadian energy prices, particularly those of crude petroleum and natural gas, are administered by the federal government and the producing provinces. The approach has been to <u>gradually</u> adjust domestic energy prices towards world prices. The Government of Canada has chosen to select a set of

targets in the region of world price rather than indicate a specific world price. A choice not to select a specific world price target is understandable. Canada should also keep domestic energy prices in line with its major trading partner, the United States.

In December 1978, Canadian domestic crude petroleum prices were 20 to 25 per cent below the world price; by July 1979, 6 months later, the Canadian price was 60 per cent of the world price of crude petroleum. Canadian domestic crude petroleum prices have a long way to go to catch up to world prices -- much more than what was thought necessary a year ago. In examining Canadian medium-term economic prospects we are compelled to be specific about the path of domestic energy prices which will lead to domestic and world crude petroleum price parity. At the same time, we recognize the importance of this assumption. Given the significant and pervasive nature of crude petroleum in the Canadian economy, the choice of path for the domestic crude petroleum price is crucial for the outcome of the medium-term outlook. We therefore chose to deal with this problem by considering three different simulations each with alternative paths for domestic crude petroleum price adjustment.

III A The Three Alternative Crude Petroleum Price Paths

These three simulations each have a common assumption set (those outlined in Section II). They differ only in the

crude petroleum pricing assumptions. The three alternatives for domestic crude petroleum prices are introduced into CANDIDE Model 2.0, one at a time, with no changes in other assumptions. Each simulation in isolation is extremely tentative and should be viewed with caution. The recent debate on energy prices suggests that the higher range estimates for domestic energy price adjustment are more realistic than the lower range estimates. Because of the importance of the assumptions concerning domestic adjustment to world crude petroleum prices, we have foregone the tradition of using a single simulation as a reference solution. All three of the alternative domestic energy price solutions are used to analyse a reference environment. When these solutions are viewed as a trio, the implications are quite informative.

The recent OPEC crude petroleum price increase in 1979 of 45 per cent will require domestic energy prices (both crude petroleum and natural gas) to increase at a faster rate than we have assumed previously (see Table 3-2 for details). The first of the three solutions which compose "the world crude petroleum price environment" includes the assumption that world prices will increase by an average of 40 per cent in 1979, 25 per cent in 1980, and 7 per cent thereafter. It also assumes that Canadian domestic crude petroleum prices achieve world parity by 1986. Adjustments are also made to export and import energy prices, the oil export tax and import subsidy,

provincial royalties and equalization payments. These adjustments account for the impact that existing federal/provincial agreements will have in these areas, given the assumed path for crude petroleum prices.

The second solution presupposes the same set of assumptions concerning the world crude petroleum price as embodied in the first. However, domestic energy prices achieve world parity by January 1982. In this environment, the price of domestic crude petroleum will increase very quickly during the period 1980 and 1981. In this simulation, energy export and import prices remain the same -- only domestic energy prices are altered and related adjustments are made to the oil export tax and import subsidy, provincial royalties, and equalization payments for the reasons mentioned previously.

For purposes of comparison, a solution which assumes that domestic and world energy prices grow at 8 per cent per year during the period 1979-85 is also developed. Adjustments are made to energy import and export prices, the oil export tax and import subsidy, provincial royalties, and equalization payments to insure consistency with the assumed movement in energy prices in this alternative. In each of these solutions, all other assumptions include the common set discussed in Section II. Let us now consider the energy price assumptions associated with each of the above-mentioned solutions.

III B Energy Assumptions Common to the Three Solutions

Before turning to the details of the scenarios, we briefly discuss energy assumptions common to all three solutions. These include the volumes of trade in crude petroleum and natural gas, and energy investment.

III B.1 Export and Import Volumes

Exports

Natural gas exports include existing licensed exports as per the National Energy Board, plus additional exports of .3 Tcf per year in 1980 and 1981 and .1 Tcf per year for the rest of the projection period. This gives rise to one trillion cubic feet of additional natural gas exports during the projection period and is an interpretation of the application of the revised protection procedure in the determination of additional exports established by the NEB in the 1979 gas report.[2]

The National Energy Board policy regarding crude petroleum exports is one of conservation of domestic oil for future domestic availability. This entails a rapid reduction in exports of all types of crude petroleum with the exception of limited exports of heavy oil as determined in the most recent oil report.[3]

In our projection for crude petroleum exports, consideration has been taken of those trade flows arising out of the "swaps" program where oil is exported to the United States from Western Canada and equivalent amounts are imported into Canada in the east at a later time. Although this program is designed to have no effect on our balance of payments, the resulting trade flows appear in Trade of Canada statistics and must be accounted for. The program has been established with an unlimited time horizon, and as such we have assumed that it will involve an average of 35 million barrels a year during the projection period. Thus, additional exports of crude petroleum have been assumed in order to allow for this program.

Imports

Our assumptions concerning imports of crude petroleum can be divided into two areas. The first is connected with the program of "swaps" referred to above and currently applies to about 13 per cent of our imports.

The second and by far the largest area is related to the import requirements calculated in the energy system.[4] Domestic demand (which is assumed to increase at 1.5 per cent per annum) and export allowances are subtracted from production to obtain the quantity of crude oil imports required to close the gap. This total is then further adjusted to reflect any surpluses or shortages in natural gas requirements, assuming

substitution is possible. Given the present projection of production available during the period from conventional sources and tarsands, the implication is that by 1985 we will be importing over 40 per cent of our domestic requirements of crude petroleum.

Table 3-1 presents the volumes of crude petroleum and natural gas exports and imports that are assumed.

III B.2 Investment

Electric Utilities

Earlier projections of electric utility investment such as those included in the 1977 energy financing document produced by Energy, Mines and Resources[5] have undergone review and as a result have been scaled down by most provincial utilities. These revisions of investment intentions have been based on forecasts showing excess capacity resulting from a marked reduction in projected demand over the next decade.

We have exogenized the equations for construction and machinery and equipment utilities investment. For both types of investment (construction is approximately 70 per cent of total investment in the industry), we have assumed no growth in 1979, followed by a 2.0 per cent increase in 1980, and a 2.5 per cent per annum rate of growth for the remainder of the

period. This results in cumulative utilities investment during the projection period of close to $25 billion in 1971 dollars.

Table 3-1

Volume of Crude Petroleum and Natural Gas Trade

(Million of 1971$)

	Exports		Imports
	Crude Petroleum[1]	Natural Gas	Crude Petroleum[1]
1979	186.1	293.0	446.7
1980	152.7	362.9	444.8
1981	128.2	347.2	440.3
1982	123.0	294.8	505.6
1983	137.1	283.6	598.5
1984	142.3	278.7	751.2
1985	146.5	271.4	853.5

1 Included in this estimate is an allowance for trade flows arising from the program in which oil is exported in the west and imported in the eastern part of the country. This allowance particularly impacts exports since they would be declining over the whole period without the inclusion of the trade arising from this program.

Source: Estimates by Economic Council of Canada.

Pipelines

Ongoing investment in established pipeline systems is forecasted to result in some $2.1 billion (1971$) over the projection period. Considering the present state of uncertainty regarding the Alaska Highway gas pipeline project, we have included it in the three solutions, but have deferred its construction such that the peak construction period occurs in 1983 and 1984. Over our projection period cumulative investment in this project amounts to over $2.5 billion (1971$).

In order to properly integrate pipeline investment into the solutions, the proportion of pipeline investment in relation to overall transportation investment was calculated. This amount was subtracted from the output of the stochastic equations for construction and machinery and equipment transportation investment, and was replaced by calculations from the energy system which included the pipeline investment described above. The equation was then exogenised and a new estimate introduced for transportation investment, of which a large proportion was centered in nonresidential investment.

Oil Sands

The extended Syncrude plant plus the recently approved Alsands oil sands plant together are assumed to

contribute a total of $4.7 billion (1971$) of additional investment during the projection period. (No additional production from these sources is assumed to come on stream during the projection period. The Alsands plant will evidently not come on stream until 1986.)

As well, marginal ongoing investment in the Great Canadian Oil Sands (G.C.O.S.) plant is assumed. The Cold Lake plant, which was also recently approved by the Alberta government, is not included in these solutions, but rather is examined in an alternative simulation that incorporates it, as well as considerable investment in, and production from, enhanced recovery sources.

In the incorporation of these assumptions for oil sands investment into the simulations, the stochastic equations for crude petroleum and natural gas mining were exogenised and oil sands investment added to the output of the equation. It is estimated that close to 75 per cent of this investment falls in the area of nonresidential construction.

III C World Petroleum Price Parity by 1986 - Specific Assumptions

The most crucial assumption in the area of price developments is that regarding movements in the international price of crude petroleum. In order to take account of recent pricing developments, a U.S. dollar international FOB price

for imported crude ranging from $18 per barrel, in the case of Saudi Arabia, to $23 for Algeria and Ecuador was weighted by the January-March 1979 composition of our crude petroleum imports and converted to Canadian dollars assuming an exchange rate of .862 $U.S.[6] The calculation resulted in a price of $23.93 per barrel ($Cdn) for the last six months of 1979, which was then weighted with estimates of the prices over the first six months to give an estimate for the year of $20.78 ($Cdn). The OPEC price was then assumed to rise by a further 8.5 per cent in 1980 (which results in an average increase of 25 per cent for the year, see Table 3-2). For the remainder of the projection period, we assumed that this price will be maintained in real terms; an increase of 7.0 per cent per annum until 1985. This results in a per barrel price of $36.41 by 1985. With the addition of average overseas/ Portland and Portland/Montreal transport costs, the Montreal price of imported crude in 1979 is estimated to be $22.33 ($Cdn) per barrel.

The <u>average</u> Toronto City Gate price (the domestic price) for the year 1979 is set at $14.20. In the 1986 parity case, it is assumed this price will reach equivalency with the international (Montreal) price by January 1, 1986. With the additional increases in the international price referred to above, this assumption results in average increases of $2.00 per barrel every six months until world price is reached. It should be remembered that in the

Wharton scenario used in the simulations (and discussed in Section II), the Carter pricing policy where domestic upper tier crude reaches world price (less domestic transportation) by September 30, 1981 has been incorporated.

The domestic price of natural gas (the Toronto City Gate price) is calculated so as to reflect increases in the price of crude petroleum, and is assumed to maintain the .850 btu price equivalency with petroleum that is presently established. Likewise, the export price of natural gas is also assumed to maintain this ratio.

In order to incorporate these assumptions into the solutions, the value-added deflator for crude petroleum and natural gas mining, and the implicit consumption deflators for natural gas, other fuels (largely fuel oil), and gasoline, oil, and grease were exogenised and set to a growth path consistent with the above assumptions.

The exogenous export price indexes for crude petroleum, natural gas and fuel products reflect the above international price movements, as do the import price indexes for crude petroleum and for fuel products. In Tables 3-2 and 3-3, we record the above price assumptions as they are incorporated in the 1986 Parity simulation.

Table 3-2

Fossil Fuel Price Assumptions
Crude Petroleum & Natural Gas Price Assumptions
Parity by 1986

(Average price for the year)

	1979	1980	1981	1982	1983	1984	1985
Crude Oil ($BBL)							
International Price (FOB, $Cdn., % pa)	40.8	25.0	7.0	7.0	7.0	7.0	7.0
International Price (at Montreal, $Cdn.)	22.333	27.564	29.430	31.424	33.555	35.834	38.270
Toronto City Gate Price	14.20	17.70	21.70	25.70	29.70	33.70	37.70
Domestic Wellhead Price	13.24	16.70	20.65	24.61	28.56	32.51	36.45
Natural Gas ($/MCF)							
Toronto City Gate Price	2.08	2.59	3.18	3.77	4.35	4.94	5.53
Domestic Wellhead Price	1.52	2.01	2.57	3.14	3.69	4.19	4.76
Export Field Price	2.92	3.69	3.93	4.20	4.50	4.82	5.15

Source: Estimates by Economic Council of Canada.

Table 3-3

Exogenous Energy Price Assumptions in Parity (1986) Simulation

(Average annual percentage change)

	1979	1980	1981	1982	1983	1984	1985
Domestic Prices							
Value-added deflator for crude petroleum and natural gas mining	26.5	13.4	14.1	15.0	18.3	16.3	14.5
Consumption deflators:							
- natural gas	8.0	13.4	13.3	16.5	23.5	13.1	12.0
- other fuels	12.2	12.3	13.3	16.8	23.9	13.4	12.1
- gasoline, oil & grease	8.1	10.6	10.5	12.6	17.1	11.3	10.6
Trade Prices[1]							
Export:							
- crude petroleum	41.8	25.0	7.0	7.3	6.8	7.2	7.5
- natural gas	44.6	25.0	7.0	7.3	6.8	7.2	7.5
- fuel products	16.0	12.2	9.2	7.4	6.9	7.3	7.6
Import:							
- crude petroleum	43.3	26.7	7.2	7.5	6.9	7.3	7.6
- fuel products	18.1	13.2	10.2	7.5	6.9	7.3	7.6

1 Export and Import prices are stated in Canadian dollars.

Source: CANDIDE Parity 1986 Solution.

III C.1 Royalty Revenues

Royalty income accruing to the provincial governments is treated exogenously within CANDIDE Model 2.0. In order to determine the revenues forthcoming, detailed calculations assessing crude petroleum and natural gas royalty revenues accruing to the federal and provincial governments are made within the energy system.

For old and new oil, formulae based on the Alberta royalty formula are used.[7]

For old oil, this formula states that:

$$\text{Total Royalty} = 12 \left(sa + \frac{\gamma sa \, (P^W - P^S)}{P^W} \right) .n.p^W$$

where sa is the basic royalty in barrels per month, equivalent to 25 per cent of a well's production of old oil greater than 1200 barrels a month, plus an additional 180 barrels

γ is the royalty factor, estimated in our calculations as being 1.650 for old oil

P^W is the wellhead price of crude oil

P^S is the select price, which we established at 6.00 per barrel.

n is an estimate of the number of individual wells

For new oil, which is that production arising from reserve additions and pentanes plus, the same formula is used, except that the royalty factor is estimated as being .600.

In actuality, the wellhead price of crude oil and the royalty factor changes every time there is a price increase so that close to 50 per cent of the increase is captured by the province.

For production arising from oil sands, a generalized formula is used that calculates royalties based on a rate of 20 per cent on production exceeding 900,000 monthly barrels and where the transport costs are deductable from the wellhead price before the calculation is made. In actuality, the outcome of this calculation results in an effective royalty rate (ratio of royalty revenue to total industry receipts for the commodity) in the area of 16 to 18 per cent during the projection period.

Three separate calculations for natural gas are made -- for old and new gas, and for exports. In the case of exports an effective royalty rate of .410 in 1979, rising to .430 in 1985, is applied to 80 per cent of the volume of gas licensed for export times the field export price minus 10¢.

For old gas, which is classified as gas production arising from established reserves, an effective royalty rate of .435 (scaling to .450 later in the period) is applied to 80 per cent of the production times the wellhead price of gas less 15¢. In the case of new gas, which is assumed to be all other gas arising out of production less that destined for

export markets, a much lower royalty rate, ranging from .310 to .340 over the period, is applied to total production times the wellhead price.

Other formulae calculating royalties accruing to the federal government apply in the case of oil and gas from frontier sources, however, in the Parity 1986 solution, no production is anticipated to come on stream from these sources during the projection period.

The above formulae are used in the calculation of royalties on all production arising from all geographic areas. However, royalty formulae in the other producer provinces differ from Alberta's. For example, legislation in British Columbia is designed differently and is not directly linked to price increases. (Several factors used in our interpretation of the formula have been selected with a view to compensating for possible overestimation of royalties.)

Table 3-4 presents the composition of provincial royalty revenues in the Parity 1986 simulation, as calculated by these methods. Federal government equalization payments which are influenced within certain limits by natural resource revenues are also presented in this table.

Table 3-4

Royalty Revenues and Equalization Payments
Parity by 1986

	Royalty Revenues			Equalization
	Oil	Gas	Total	Payments
1979	2577	2178	4755	3600
1980	3416	3195	6611	3960
1981	4351	3828	8179	4128
1982	4938	4346	9284	4457
1983	5168	4813	9981	4978
1984	5267	5206	10473	5432
1985	5270	5808	11078	5736

Source: Estimates by Economic Council of Canada.

III C.2 Federal Government Energy-Related Expenditure and Revenue Programs

Some federal government programs are directly impacted by assumptions concerning crude petroleum pricing. These three programs, the oil import subsidy program, the oil export tax and the gasoline excise tax programs are discussed below.

Oil Import Subsidy

Under a program of oil compensation payments, oil importers receive compensation which enables them to buy the oil at the international price and to sell to domestic users at the lower domestic price. This program, which was implemented on January 1, 1974, effectively provides assistance to areas of Canada which are dependent on imported crude for their energy supplies.

In order to estimate the payments forthcoming due to the program, the volume of imports, less "swaps", is multiplied by the difference between the international price (in Canadian dollars at Montreal) and the Toronto City Gate price. As the program is designed to offset the impact of the differential pricing system, the subsidy will fall to zero when world price is attained.

Oil Export Tax

A crude oil export charge was established in October 1973 whereby a tax is assessed on the difference between the international export price, secured by exporters of crude petroleum for their product, and the domestic price. In our system, the volume of allowable exports of crude petroleum is multiplied by the difference between the

international price and the Toronto City Gate price. As in the case of the oil compensation program, it is assumed that these tax revenues will phase out as we reach world price.

Gasoline Excise Tax

A special 10 cent excise tax on motor gasoline for noncommercial use was implemented in June 1975. A system was introduced whereby commercial users of gasoline, industries, farmers, etc., could claim rebates of the portion of the tax relevant to their usage of gasoline. Last year the rate of this tax was reduced from 10 cents to 7 cents, and it has been extended to new forms of gasoline, i.e., super unleaded, as they come onto the market.

There has been no indication that this tax will be phased out like the export tax program, and our projection for the period assumes a moderate increase in the revenues incorporating a very moderate increase in consumption and a continuation of the 7 cent tax.

The assumptions explicit in the Parity 86 case for these three programs are set out in Table 3-5.

Table 3-5

Federal Government Programs Relating to Energy Parity by 1986

	Taxation		Subsidies
	Oil Export Tax	Gasoline Tax	Oil Import Subsidy
1979	650	500	1500
1980	486	525	2344
1981	278	551	1706
1982	183	589	1391
1983	116	630	1305
1984	53	675	907
1985	13	722	275

Source: Estimates by Economic Council of Canada.

III D World Petroleum Price Parity by 1982 - Specific Assumptions

In the 82 Parity simulation, it is assumed that the domestic price of crude petroleum reaches world price by January 1982. With the same increases in the international price as described in the 86 Parity simulation, this assumption results in average increases of $3.50 per barrel every six months until world price is reached. It is further assumed that the similar rate of increase will apply to the domestic price of natural gas with the .850 btu equivalency maintained. Table 3-6 outlines the price movements resulting from the above assumptions over the projection period.

Table 3-6

Fossil Fuel Price Assumptions
Crude Petroleum & Natural Gas Price Assumptions
1982 Parity Case

	(Average Price for Year)						
	1979	1980	1981	1982	1983	1984	1985
Crude Oil ($/BBL)							
International Price (FOB, $Cdn., % pa)	40.8	25.0	7.0	7.0	7.0	7.0	7.0
International Price (at Montreal, $Cdn.)	22.333	27.564	29.430	31.424	33.555	35.834	38.270
Toronto City Gate Price	14.200	19.450	26.450	31.424	33.555	35.834	38.270
Domestic Wellhead Price	13.240	18.450	25.400	30.334	32.415	34.644	37.020
Natural Gas ($/MCF)							
Toronto City Gate Price	2.081	2.850	3.876	4.605	4.918	5.252	5.609
Domestic Wellhead Price	1.521	2.270	3.266	3.975	4.258	4.507	4.845
Export Field Price	2.917	3.670	3.927	4.204	4.499	4.816	5.154

Source: Estimates by Economic Council of Canada.

In order to incorporate these assumptions into CANDIDE Model 2.0, the final demand deflators for consumer spending on natural gas, other fuel products (largely heating oil), and gasoline and oil products were exogenised and assumed to increase at a growth path consistent with the increase in the Toronto City Gate price. The value-added deflator for the crude petroleum and natural gas industry was similarly adjusted. Table 3-7 illustrates the assumed percentage changes in these four energy-related prices.

Provincial Royalties

The revised domestic wellhead price assumptions were incorporated in the royalty formulae (described earlier) in order to calculate the provincial royalties implied by the 82 Parity assumption. A proportionally similar adjustment was made to federal government equalization payments to the provinces. Table 3-8 outlines the royalty revenue arising out of the 82 Parity assumption and the revised equalization payments.

Table 3-7

Exogenous Energy Price Assumptions in 82 Parity Case

(Average annual percentage change)

	1979	1980	1981	1982	1983	1984	1985
Domestic Prices							
Value-added deflator for crude petroleum and natural gas mining	26.5	12.9	19.0	13.0	9.7	9.2	8.8
Consumption deflators:							
-- natural gas	8.0	20.0	20.0	20.0	20.0	7.0	7.0
-- other fuels	12.2	20.0	20.0	20.0	20.0	7.0	7.0
-- gasoline, oil & grease	8.0	15.0	15.0	15.0	15.0	7.0	7.0

Source: CANDIDE 82 Parity Solution.

Table 3-8

Royalty Revenues and Equalization Payments
Parity by 1982

(Millions of Current Dollars)

	Royalty Revenues			Equalization
	Oil	Gas	Total	Payments
1979	2577	2178	4755	3600
1980	3869	3392	7261	4220
1981	5556	4402	9958	4840
1982	6276	5091	11367	5290
1983	5961	5299	11260	5490
1984	5654	5464	11118	5690
1985	5361	5877	11238	5800

Source: Estimates by Economic Council of Canada.

Export Tax and Import Subsidies

In accordance with the movement to parity with the world price by 1982, the flows connected with the oil import subsidy and export tax programs (described in the 86 Parity Case) were revised to reflect this assumption. Since the time horizon of the gasoline excise tax program is unlimited and the tax is a per gallon tax, the assumptions for this variable explicit in the 86 Parity Case were maintained.

Table 3-9 below describes the revised export tax and import subsidy assumptions.

Table 3-9

82 Parity Assumptions
Concerning Federal Energy-Related Programs

(Millions of Current Dollars)

	Oil Export Tax	Oil Import Subsidy
1979	650	1500
1980	486	1900
1981	149	650
1982	0	0
1983	0	0
1984	0	0
1985	0	0

Source: Estimates by Economic Council of Canada.

III E No Parity with World Crude Petroleum Price - Specific Assumptions

While the OPEC ministers have already agreed on a crude petroleum price increase of approximately 40 per cent for 1979 over the 1978 average, it was of interest for purposes

of comparison to consider a simulation in which the real price of crude petroleum was maintained at the 1978 level. In order to do this, an international level of inflation of 8 per cent was postulated to have been assessed by the OPEC ministers over the 1979-85 period. The international price of crude petroleum (expressed in Canadian dollars) was assumed to increase at this rate and it was further assumed that the Toronto City Gate price would increase at the same rate.

These assumptions were incorporated into the energy accounting system and the derived implications for prices, royalties, subsidies and taxes were incorporated into CANDIDE Model 2.0.

Export and import prices for crude petroleum, natural gas and fuel products in terms of U.S. dollars were modified to reflect the revised international price of oil. The final demand deflators for natural gas, other fuel products (largely fuel oil) and gasoline, oil and grease were exogenised and assigned growth rates appropriate to the international assumptions. The value-added deflator for the crude petroleum and natural gas industry was similarly exogenised. The price assumptions for these variables are outlined in Table 3-10.

Table 3-10

Exogenous Energy Price Assumptions in No Parity Case

(Average Annual Percentage Change)

	1979	1980	1981	1982	1983	1984	1985
Domestic Prices							
- Value-added deflator for crude petroleum & natural gas mining	7.8	7.8	7.8	7.8	7.8	7.8	7.8
Consumption Deflators							
- Natural gas	8.0	7.0	6.5	6.5	6.5	6.5	6.5
- Other Fuels	10.0	7.0	6.5	6.5	6.5	6.5	6.5
- Gasoline, oil & grease	8.0	6.5	6.0	6.0	6.0	6.0	6.0
Trade Prices							
Export							
- Crude Petroleum	7.7	7.7	7.7	7.8	7.8	7.8	7.8
- Natural Gas	9.9	7.7	7.7	7.8	7.8	7.8	7.8
- Fuel Products	6.2	6.2	6.2	6.2	6.2	6.2	6.2
Import							
- Crude Petroleum	8.0	8.0	8.0	8.0	8.0	8.0	8.0
- Fuel Products	6.2	6.2	6.2	6.2	6.2	6.2	6.2

Source: CANDIDE No Parity Solution.

It was also assumed that the rate of increase of consumption of natural gas and fuel oil would move up to 1.5 per cent per annum from the 1.0 per cent assumed in the cases where we achieve parity with world prices. Similarly, the growth rate of consumption of gasoline, oil and grease was revised upwards to 1.2 per cent from the 0.8 per cent assumed in the high priced oil solutions.

Provincial Royalties

Using the royalty formulae (described previously) with the revised wellhead price assumptions, we obtain estimates of provincial royalty revenues. Federal government equalization payments are also proportionately revised. Table 3-11 outlines the royalty assumptions specific to the No Parity simulation.

Table 3-11

Royalty Revenues and Equalization Payments
No Parity Simulation

(Millions of Current Dollars)

	Royalty Revenues			Equalization
	Oil	Gas	Total	Payments
1979	2736	1987	4723	3587
1980	2970	2368	5338	3451
1981	3223	2647	5870	3205
1982	3287	2845	6132	3196
1983	3199	3014	6213	3471
1984	3103	3147	6250	3743
1985	3005	3442	6447	3884

Source: Estimates by Economic Council of Canada.

Export Tax and Import Subsidies

The revenues involved in the export tax program along with the oil import subsidy expenditures were revised to reflect the No Parity price assumptions. This account, which was already in deficit in the cases where we attain parity with world prices, is now substantially in deficit as export revenues decline as exports are phased out, and the gap between domestic and world prices remains large, necessitating heavy subsidy payments. Table 3-12 details the assumptions made in the No Parity case for these programs.

Table 3-12

Export Tax and Oil Import Subsidies
No Parity Simulation

(Millions of Current Dollars)

	Export Tax	Oil Import Subsidies
1979	215	555
1980	170	723
1981	152	710
1982	147	815
1983	148	1175
1984	139	1537
1985	135	1831

Source: Estimates by the Economic Council of Canada.

III F "The World Crude Petroleum Price Environment"

We now examine the path for a selected set of economic indicators under a variety of domestic energy price adjustment assumptions. We examine the impact that rapid increases in energy prices could have on real growth, the consumer price index, the unemployment rate, the rate of growth of employment, the rate of growth of labour force, the rate of growth of productivity, the rate of growth of the real wage, federal and provincial deficits (or surpluses), and the balance of payments. The path for these selected indicators is recorded in Table 3-14.

III F.1 The Consumer Price Index

If there is no real increase (No Parity) in the price of crude petroleum (solution #3, the #2 solution) inflation rates, although above 9 per cent in 1979, would follow a downward path and eventually stabilize in the 7 per cent range by mid-decade. At the opposite end of the spectrum is solution #2, the $7 solution. Here the domestic price reaches world price by January 1982 and inflation rates remain in the 9.5 per cent range during the period in which domestic price adjustment takes place. Once full adjustment is complete, the rate of inflation declines to near 7.5 per cent by mid-decade. Between these two extremes is solution #1, the $4 solution.

Table 3-13

The Consumer Price Index and the Price of Crude Petroleum

	Solution #3 8% Growth in Crude Petroleum Price		Solution #1 Parity with World Price By 1986 (Deviation from 3)			Solution #2 Parity with World Price By 1982 (Deviation from 3)		
	$ per Barrel	Consumer Price Index[1]	(a) $ per Barrel (absolute)	(b) CPI (per cent)[2]	(c) b/a	(a) $ per Barrel (absolute)	(b) CPI (per cent)[2]	(c) b/a
1980	15.98	205.4	1.72	1.05	(.61)	3.52	1.97	(.56)
1981	17.26	220.4	4.44	2.20	(.50)	9.19	4.11	(.45)
1982	18.64	235.9	7.06	3.62	(.51)	12.78	6.22	(.49)
1983	20.13	252.4	9.57	5.53	(.58)	13.42	8.04	(.60)
1984	21.74	269.4	11.96	7.10	(.59)	14.09	8.86	(.63)
1985	23.48	287.4	14.22	8.44	(.59)	14.78	9.36	(.64)

1 1971 = 100.0.

2 Per cent deviation from CPI in Solution 3.

Source: CANDIDE Model 2.0.

Here inflation rates are below those of solution #2 in the early part of the decade, but are above those of solution #2 by mid-decade. At mid-decade the level of the consumer price index in both solution #1 and solution #2 are within one percentage point of each other.

A policy to move to world crude petroleum price carries with it a decision to inject inflationary pressures into the Canadian economy -- pressures that would not normally result from current conditions in product or factor markets. Furthermore, the speed with which the Government of Canada chooses to approach world price will have little effect on the final level of the CPI once full adjustment is made, but a great deal of impact on the path for the CPI to this new higher level. This point is illustrated in Table 3-13. If there is no increase in the real price of crude petroleum in Canada, we would expect the consumer price index to be 8-9 per cent lower (compared to either world parity solution) by 1985. As we reduce the period of time in which we move to world price, the inflation bulge will show itself as a near-term outcome. Canadians will either pay now or pay later.

III F.2 Real Income

The impact that a movement to world prices could have on growth in the real wage is recorded in Table 3-14. The real wage in Canada has performed poorly in the recent past.

Table 3-14

Selected Indicators - "World Crude Petroleum Price Environment"

	1979	1980	1981	1982	1983	1984	1985
			(Percentage Increase)				
Selected Indicators							
Gross National Product (1971$)							
Solution #1 Parity by 1986	2.9	2.7	4.6	4.5	3.0	3.3	3.0
Solution #2 Parity by 1982	3.0	2.5	4.3	4.3	3.0	3.4	3.0
Solution #3 No Parity	2.8	2.6	4.9	4.9	3.5	3.8	3.3
Consumer Price Index							
Solution #1 Parity by 1986	9.5	8.6	8.5	8.5	9.0	8.3	8.0
Solution #2 Parity by 1982	9.5	9.6	9.5	9.2	8.8	7.6	7.2
Solution #3 No Parity	9.1	7.9	7.3	7.0	7.0	6.7	6.7
Unemployment Rate (level)							
Solution #1 Parity by 1986	7.7	7.8	6.9	5.9	5.4	5.3	5.3
Solution #2 Parity by 1982	7.7	7.6	6.7	5.8	5.6	5.5	5.7
Solution #3 No Parity	7.9	8.2	7.4	6.3	5.8	5.4	5.4
Labour Force							
Solution #1 Parity by 1986	1.7	2.1	1.8	1.7	1.7	1.8	1.8
Solution #2 Parity by 1982	1.7	2.0	1.7	1.6	1.8	1.9	1.9
Solution #3 No Parity	1.8	2.2	2.0	1.9	1.9	1.9	1.9
Employment							
Solution #1 Parity by 1986	2.3	2.1	2.8	2.8	2.2	2.0	1.8
Solution #2 Parity by 1982	2.3	2.1	2.7	2.7	2.0	2.0	1.7
Solution #3 No Parity	2.2	1.9	2.9	3.0	2.4	2.4	1.9
Productivity							
Solution #1 Parity by 1986	0.7	0.8	1.8	1.7	0.9	1.8	1.6
Solution #2 Parity by 1982	0.7	0.4	1.6	1.7	1.2	2.0	1.8
Solution #3 No Parity	0.7	1.0	2.2	1.9	1.3	1.8	1.9
Real Wage Rate							
Solution #1 Parity by 1986	-0.9	0.5	0.7	1.1	1.3	2.5	2.6
Solution #2 Parity by 1982	-0.9	-0.5	0.4	1.2	1.9	3.1	2.9
Solution #3 No Parity	-0.6	0.8	1.3	1.6	2.2	2.7	3.0
Federal Deficit (% of GNE)							
Solution #1 Parity by 1986	-4.2	-4.3	-3.7	-3.0	-2.7	-2.4	-2.1
Solution #2 Parity by 1982	-4.2	-4.2	-3.6	-3.0	-2.7	-2.5	-2.3
Solution #3 No Parity	-4.2	-4.0	-3.3	-2.5	-2.1	-1.7	-1.5
Provincial Deficit (% of GNE)							
Solution #1 Parity by 1986	0.2	0.9	1.4	1.6	1.9	1.6	1.5
Solution #2 Parity by 1982	0.3	1.2	1.9	2.1	2.1	1.7	1.5
Solution #3 No Parity	0.2	0.4	0.6	0.7	1.0	0.7	0.7
Balance of Payments (% of GNE)							
Solution #1 Parity by 1986	-2.5	-1.8	-1.8	-2.2	-2.1	-2.5	-2.7
Solution #2 Parity by 1982	-2.5	-1.8	-1.7	-2.0	-1.9	-2.4	-2.6
Solution #3 No Parity	-2.4	-1.8	-1.9	-2.3	-2.2	-2.5	-2.6

Source: CANDIDE Model 2.0.

Even if there is no increase in the real price of crude petroleum we expect continued poor performance in the early 1980's, with a movement to higher growth rates by mid-decade. However, a rapid adjustment to world price will depress growth in the real wage. The faster Canada approaches world price, the more real incomes will be depressed in the early part of the decade. A movement to world prices by January 1982 could bring real income growth (per worker) in Canada to a standstill in 1980-81. In solution #2, the decline in the real wage in 1980 is barely compensated for by the increase in 1981.

III F.3 Gross National Expenditure

The impact of energy prices on the consumer price index and the real wage contributes to an explanation of the differences in the growth rate for GNE when comparing solution #1, #2 and #3 (Table 3-14). In the section on real incomes we indicated that the increase in the real price of crude petroleum leads to reductions in the growth rate of real incomes throughout the projection period. The net effect of this is a reduction in the growth rate of real GNE in the early part of the decade which leads to a reduction in the level of GNE by mid-decade. The main elements contributing to this reduced growth rate are reduced consumer spending and the associated induced effects on investment and inventory accumulation. Consumer spending is

depressed because of the impact that crude petroleum price adjustment will have on real incomes. The 4 per cent growth rates in the 1981-82 period are the result of strength in domestic energy investment and in export markets.

III F.4 Employment

The growth of employment will follow a cyclical pattern which is not inconsistent with the path of GNE just outlined. Energy price adjustments have small but directionally significant impacts on employment growth. There are two forces at work. First, rapid price adjustment will depress activity levels. This depresses employment growth. However, at the same time, real wages are depressed and thus labour becomes a more attractive factor than capital in the production process. These two forces join together and partially offset each other.

III F.5 The Unemployment Rate

The path which the unemployment rate takes in our comparative energy price statement should be considered carefully. The major impact that a movement to world prices could have on unemployment rates in the near term can be traced to the supply side (labour force). In solution #3, where there is no increase in the real price of energy,

initially we see a higher unemployment rate. There are three forces at work here. First, a movement to world price will depress real incomes and reduce activity levels. There is evidence that labour force participation rates, especially those associated with the secondary labour force, are sensitive to income opportunity. A rapid movement to world prices will depress real incomes, reduce opportunity, and have a depressing effect on participation rates. The net effect will be a reduction in the rate of growth of labour force. We have previously outlined the offsetting effects that higher crude petroleum prices will have on labour demand. The combined impact of these factors on the unemployment rate indicates that initially the supply side effects will be larger than the demand side effects in labour markets. The result may be downward pressure on the unemployment rate in a higher priced energy environment.

These results bring out the inappropriateness of using the unemployment rate to judge the success or failure of any given policy. The energy story as translated to labour markets indicates higher energy prices will depress entry into the labour force more than reduced activity levels will depress employment opportunity. In the long run, the three simulations show little variation in unemployment rates. In the simulations which reach world price by 1986 (solution #1), we see both a decrease in employment levels and a decrease in labour force levels.

The net effect of this is an unchanged unemployment rate. What we have witnessed here at best is the shifting Phillips Curve or the lack of a long-run trade off between unemployment rates and inflation rates; at worst it appears that the average rate of unemployment and the rate of inflation are best regarded as unrelated in the case where inflation is imposed by a policy initiative and is not the result of normal conditions in product and factor markets.

III F.6 Productivity Developments

We have witnessed in the late 1970's poor growth in productivity. In solution #3, where there is no increase in the real price of crude petroleum, we see a recovery of the rate of growth of productivity to a level slightly below 2 per cent per year by mid-decade. The faster we move to world prices the longer this recovery will be delayed. A movement to world prices by 1982 could depress productivity growth in the early part of the decade by approximately one half of one percentage point per year. By mid-decade, the rate of growth of productivity shows less variation across all three solutions. The downward shift in the rate of growth of productivity in the early part of the decade is partly due to distortions in factor prices and reduced levels of non energy related investment which will occur as a result of the output loss. This downward pressure on productivity will also contribute to higher unit labour

costs, and put additional pressure on prices throughout the period.

III F.7 The Federal and Provincial Budget Balance

If the Government of Canada were to do away with the policy to adjust domestic energy prices to world levels, we would see a progressive movement in the deficit associated with all levels of government to a balanced position by mid-decade. The federal government would still be in deficit but the provinces, the municipal and local governments and the Canada/Quebec Pension plan would offset this deficit with an equally large combined surplus. In the early part of the decade, the federal government will continue to be in a very poor budget position. A decision to go to world prices with its direct impact on depressing real incomes, increasing the rate of inflation, and depressing real growth will progressively weaken the federal budget position.

In order to interpret the real meaning of this deficit, we must consider also the budget position of the provincial governments during this period. Two important factors should be kept in mind. In all three solutions, we assume that the federal/provincial agreements will be renegotiated in 1982 along the lines that currently exist and remain in force through the mid 1980's. The oil rich

provinces will be the recipient of large increases in crude petroleum rents as Canada moves to world price. The faster Canada moves, the more rent accrues to the oil rich provinces in the early part of the decade. The surpluses which materialize at the provincial level are quite large (2.1 per cent of GNE). The decision to move to world price carries with it pressures which will shift the burden of the deficit between the various levels of government. The quicker we move to world price, the more this burden shifts to the federal government. This is a significant result; all of these cases are developed under the assumption of strict fiscal restraint by all levels of government with no new initiatives in the area of tax policy or intergovernmental transfers.

III F.8 Balance of Payments

The balance of payments has recently exhibited poor performance as a result of growing deficits on travel and on income flows transactions arising from foreign debt servicing. We anticipate that these pressures will continue, particularly in the area of servicing foreign held debt. We also anticipate that the travel balance will continue to worsen.

In the case where we reach world price by 1982, a favourable merchandise balance, partly resulting from an

initial improvement in the terms of trade, gradually erodes as the increase in crude petroleum imports coupled with the high level of international price contributes to the size of our oil bill (the non energy merchandise balance remains favourable throughout the entire period). Although the higher energy price is expected to increase investment activity in the fossil fuel industries, no appreciable increase in supplies arising from domestic sources is anticipated to be forthcoming as a result of this activity in this relatively short time period. As a result only small offsets in the energy trade balance will occur before 1985.

Reduced provincial royalty revenues (compared to the parity by 1982 solution) during the early part of the decade in the parity by 1986 solution results in an increase in the provincial stock of foreign-held debt, thereby leading to additional income payments which contribute to a large services deficit. This pressure is augmented by additional imports resulting from somewhat increased activity during the period.

A lower oil import bill in solution #3 as a result of the assumed lower international price of oil partially offsets additional imports (consumer goods) which result from increased activity resulting from improved real incomes. Hence, there is marginal improvement in our

balance of payments position; however, it is still serious. Canada is importing the same amount of oil -- we would just be paying less for it.

III G Risks and Uncertainties Associated with The Anticipated Economic Environment

Energy induced inflation rates, persistent federal government deficits, persistent trade deficits, lower than trend productivity growth and a reduced rate of growth of output form a background to policy formation which is challenging. These challenges are heightened by both risks, in terms of assessing policy outcomes, and an unusual degree of uncertainty in the current economic environment.

For example, if labour force participation rates do not react to reduced income growth as suggested previously, the unemployment rate could be higher than projected -- in the 6 per cent rather than in the 5 per cent range by mid-decade. Again, consumer behaviour may be more volatile than anticipated. Continued inflation and uncertainty about world economic conditions could cause consumers to launch a spending spree and reduce the personal saving rate by more than we have projected. Another highly sensitive area is that of wage behaviour. Vigorous bargaining for higher money wages in the face of higher energy prices could have a serious impact on the inflation rate.

Table 3-15

Selected Indicators - Risks and Uncertainties

	1980	1981	1982	1983	1984	1985
			(Percentage Increase)			
GROSS NATIONAL PRODUCT (1971$)						
86 Parity	2.7	4.6	4.5	3.0	3.3	3.0
Lower Saving Rate	2.8	4.8	4.6	3.2	3.4	3.1
Higher Participation Rate	2.8	4.8	4.7	3.2	3.4	3.1
More Vigorous Wage Bargaining	2.7	4.7	4.6	3.2	3.3	3.0
More Energy Investment	2.7	4.8	4.8	3.3	3.4	3.1
CONSUMER PRICE INDEX						
86 Parity	8.6	8.5	8.5	9.0	8.3	8.0
Lower Saving Rate	8.6	8.5	8.6	9.0	8.4	8.2
Higher Participation Rate	8.6	8.4	8.5	8.9	8.2	7.9
More Vigorous Wage Bargaining	8.7	8.6	8.8	9.4	8.7	8.2
More Energy Investment	8.8	8.7	8.6	8.4	8.1	7.8
UNEMPLOYMENT RATE (LEVEL)						
86 Parity	7.8	6.9	5.9	5.4	5.3	5.3
Lower Saving Rate	7.7	6.8	5.7	5.2	5.0	4.9
Higher Participation Rate	7.9	7.2	6.3	6.0	5.9	6.0
More Vigorous Wage Bargaining	7.8	7.0	6.0	5.7	5.5	5.5
More Energy Investment	7.7	6.7	5.6	5.1	4.9	4.8
LABOUR FORCE						
86 Parity	2.1	1.8	1.7	1.7	1.8	1.8
Lower Saving Rate	2.1	1.8	1.7	1.7	1.8	1.8
Higher Participation Rate	2.4	2.1	2.0	2.0	2.0	2.0
More Vigorous Wage Bargaining	2.1	1.9	1.8	1.8	1.9	1.8
More Energy Investment	2.1	1.8	1.7	1.8	1.8	1.8
EMPLOYMENT						
86 Parity	2.1	2.8	2.8	2.2	2.0	1.8
Lower Saving Rate	2.1	2.9	2.9	2.8	2.1	1.9
Higher Participation Rate	2.2	3.0	3.0	2.4	2.1	1.9
More Vigorous Wage Bargaining	2.1	2.8	2.8	2.2	2.0	1.8
More Energy Investment	2.1	2.9	2.9	2.3	2.1	1.9

Table 3-15 (cont'd)

	1980	1981	1982	1983	1984	1985
	(Percentage Increase)					
PRODUCTIVITY						
86 Parity	0.8	1.8	1.7	0.9	1.8	1.6
Lower Saving Rate	0.9	1.9	1.7	1.0	1.8	1.7
Higher Participation Rate	0.8	1.9	1.7	0.9	1.7	1.6
More Vigorous Wage Bargaining	0.9	1.9	1.8	1.1	1.7	1.6
More Energy Investment	0.7	1.9	1.9	1.1	1.7	1.6
REAL WAGE RATE						
86 Parity	0.5	0.7	1.1	1.3	2.5	2.6
Lower Saving Rate	0.5	0.7	1.1	1.4	2.6	2.7
Higher Participation Rate	0.5	0.7	1.1	1.2	2.4	2.5
More Vigorous Wage Bargaining	0.6	1.0	1.6	2.1	2.5	2.7
More Energy Investment	0.3	0.6	1.2	1.7	2.3	2.7
NOMINAL WAGE RATE						
86 Parity	9.1	9.2	9.8	10.4	11.1	10.9
Lower Saving Rate	9.1	9.3	9.8	10.5	11.3	11.1
Higher Participation Rate	9.1	9.2	9.7	10.3	10.9	10.6
More Vigorous Wage Bargaining	9.4	9.8	10.6	11.7	11.4	11.2
More Energy Investment	9.1	9.4	9.9	10.3	10.6	10.7
SAVING RATE (LEVEL)						
86 Parity	10.1	9.7	9.4	9.0	8.9	8.9
Lower Saving Rate	10.0	9.4	8.9	8.4	8.1	7.9
Higher Participation Rate	10.3	9.8	9.5	9.2	9.0	9.0
More Vigorous Wage Bargaining	10.2	9.8	9.5	9.3	9.0	8.9
More Energy Investment	10.1	9.6	9.3	9.2	8.9	8.8
PARTICIPATION RATE (LEVEL)						
86 Parity	60.8	61.0	61.3	61.6	62.0	62.4
Lower Saving Rate	60.8	61.0	61.3	61.6	62.0	62.4
Higher Participation Rate	61.0	61.3	61.8	62.3	62.8	63.3
More Vigorous Wage Bargaining	60.8	61.0	61.4	61.8	62.2	62.6
More Energy Investment	60.8	61.0	61.2	61.6	62.0	62.4
REAL INVESTMENT (% OF REAL GNE)						
86 Parity	21.6	22.1	22.5	22.7	22.8	22.8
Lower Saving Rate	21.6	22.1	22.5	22.7	22.8	22.8
Higher Participation Rate	21.6	22.1	22.6	22.8	22.9	22.9
More Vigorous Wage Bargaining	21.6	22.1	22.6	22.7	22.9	22.9
More Energy Investment	21.7	22.3	23.0	23.1	23.2	23.2

Table 3-15 (cont'd)

	1980	1981	1982	1983	1984	1985
	(Percentage Increase)					
FEDERAL DEFICIT (% OF GNE)						
86 Parity	-4.3	-3.7	-3.0	-2.7	-2.4	-2.1
Lower Saving Rate	-4.3	-3.6	-2.8	-2.5	-2.1	-1.9
Higher Participation Rate	-4.4	-3.7	-3.1	-2.8	-2.5	-2.2
More Vigorous Wage Bargaining	-4.3	-3.6	-2.9	-2.6	-2.3	-2.0
More Energy Investment	-4.2	-3.3	-2.5	-2.5	-2.1	-1.8
PROVINCIAL SURPLUS (% OF GNE)						
86 Parity	0.9	1.4	1.6	1.9	1.6	1.5
Lower Saving Rate	0.9	1.4	1.6	1.9	1.7	1.6
Higher Participation Rate	0.9	1.3	1.6	1.8	1.5	1.4
More Vigorous Wage Bargaining	0.9	1.3	1.5	1.8	1.4	1.4
More Energy Investment	1.1	1.7	2.1	2.4	2.1	2.2
BALANCE OF PAYMENTS CURRENT ACCOUNT BALANCE (% OF GNE)						
86 Parity	-1.8	-1.8	-2.2	-2.1	-2.5	-2.7
Lower Saving Rate	-1.9	-2.0	-2.4	-2.3	-2.7	-3.0
Higher Participation Rate	-1.8	-1.9	-2.3	-2.2	-2.6	-2.8
More Vigorous Wage Bargaining	-1.8	-1.9	-2.3	-2.3	-2.8	-3.0
More Energy Investment	-1.8	-1.7	-1.8	-1.5	-1.7	-1.6
ENERGY BALANCE OF PAYMENTS (% OF GNE)[1]						
86 Parity	1.0	0.9	0.4	0.1	-0.4	-0.7
Lower Saving Rate	1.0	0.9	0.4	0.1	-0.4	-0.7
Higher Participation Rate	1.0	0.9	0.4	0.1	-0.4	-0.7
More Vigorous Wage Bargaining	1.0	0.9	0.4	0.1	-0.4	-0.7
More Energy Investment	1.1	1.0	0.8	0.8	0.5	0.6
NON ENERGY BALANCE OF PAYMENTS (% OF GNE)						
86 Parity	-2.9	-2.8	-2.6	-2.2	-2.1	-2.0
Lower Saving Rate	-2.9	-2.9	-2.8	-2.4	-2.3	-2.3
Higher Participation Rate	-2.8	-2.8	-2.7	-2.3	-2.2	-2.2
More Vigorous Wage Bargaining	-2.9	-2.8	-2.7	-2.4	-2.4	-2.3
More Energy Investment	-2.8	-2.8	-2.7	-2.3	-2.3	-2.2

1 Includes crude petroleum and products, natural gas and electricity.

Source: CANDIDE Model 2.0.

Furthermore, uncertainty associated with large energy related investment projects, as to their timing and implementation, could alter the growth path of the higher priced crude petroleum simulations. In each case, it is the behaviour of economic agents in response to changing economic conditions that is the key issue. The projections discussed previously are based on a careful analysis of such behavioural responses. Nonetheless, these projections have also been assessed against alternative analyses designed to test the consequences of alternative behavioural responses by workers, consumers, and producers. We have examined four cases.

These include: (1) a lower saving rate alternative; (2) a higher labour force participation rate alternative; (3) a more vigorous wage bargaining alternative, and (4) a more energy investment alternative. When assessing the impact of these alternative behavioural patterns, we must impose them upon a base case (for purposes of comparison). In this analysis, we chose the solution reported in the previous section which assumes Canadian domestic crude petroleum prices reach world parity by 1986. The analysis presented in the following pages examines the impact of these four alternatives (each separately) on the path of a selected set of economic indicators presented in Table 3-15.

III G.1 Demographic Issues

There is the possibility that Canada will continue to experience rapid rates of growth in the labour force as a result of continued increases in the participation rates of females and young males. Canadian secondary labour force participation rates are still below those of the United States. There is evidence that secondary labour force participation rates are sensitive to opportunity. In the past, we have seen a decline in the rate of growth of real income and recently, an absolute decline in real income. In our analysis of the impact of energy pricing, we see reduced opportunity for growth in real income in Canada and as a consequence, we anticipate participation rates will increase less quickly in the 1980's. In the case where Canada reaches world prices by 1986, labour force growth is approximately 1.8 per cent per year.

A continuation of past trends in labour force participation rates could lead to higher rates of unemployment as suggested in our previous analysis. This could lead to an underestimate of potential growth. We have designed a simulation which assumes that participation rates gradually increase during the 1980-85 period to one full percentage point above the solution which assumes world parity by 1986. By 1985, participation rates (old labour force basis) are 62.4 per cent in the parity by 1986

solution; in the higher participation rate alternative, they are 63.3 per cent of the labour force. This implies that labour force growth does not fall below a 2 per cent compound growth rate in this alternative. It implies by 1985 that 193,000 more people would be in the labour force.

Let us look at the long-run impacts on a selected set of economic indicators. Of the 193,000 additional members of the labour force, only 97,000 find jobs by 1985. This implies that unemployment rates will level off in the 6 per cent range rather than in the 5.3 per cent range. This increase in the number of unemployed persons leads to an increase in unemployment insurance benefits paid by the federal government. In fact, transfer payments to persons from all levels of government increase by 1.1 billion when compared to the parity by 1986 solution. The increase in federal transfer payments to persons (unemployment compensation) leads to larger federal deficits by 1985. This slightly deteriorating deficit position of the federal government leads to more growth in the public debt.

The demand side impacts are straightforward (once we have linked additional transfer payments to the increased number of unemployed persons). Increased transfer payments provide for an increase in personal income. The increase in personal income provides for an increase in real consumption

spending, and eventually to induced effects which increase the level of investment spending and inventory accumulation.

Except for small changes in the deficit position of the federal government and higher levels of activity (the result of growth in transfer type income), the results obtained from this alternative simulation are quite similar to those obtained previously. We have continued low growth, high inflation and an imbalance in both trade and the government deficit position. We also have higher unemployment rates by the end of the period (6 per cent rather than 5.3 per cent).

III G.2 Personal Saving Rate

In the simulation which assumes that we reach world prices by 1986 we anticipate a continued high persistent personal saving rate with some modest decline. The personal saving rate will remain in the 9-10 per cent range until the early part of the next decade and then fall to the 9 per cent level by mid-decade. Continued high rates of inflation induced by a movement of domestic energy prices to world levels could put upward pressure on the personal saving rate, however, as inflation winds down by mid-decade, the personal saving rate could level off in the 8 per cent rather than in the 9 per cent range. A saving rate simulation which gradually reduces the personal saving

rate 1 percentage point below that of the parity by 1986 solution was designed to uncover the implications of this pattern and suggests the following.

A gradual reduction in the saving rate from 1980 through 1985 will stimulate consumption and, as a result of this, produce higher levels of activity, lower levels of unemployment, larger trade deficits, more induced investment, marginally higher rates of growth and productivity, reduced federal government deficits and increased provincial government surpluses, and as a result lower levels of government debt. Because of the higher rates of activity, a lower personal saving rate also implies some upward pressure on prices. These results can be seen by inspecting the indicators in Table 3-15. By 1985, the unemployment rate, rather than averaging 5.3 per cent, will average 5 per cent. The federal deficit would be 1.9 per cent of GNE instead of 2.1 per cent of GNE. However, because higher activity levels imply more imports, the lower saving rate solution implies that the current account of the balance of payments would deteriorate from a deficit position of 2.7 per cent of GNE to 3 per cent of GNE. There is one additional important feature to this simulation. The total sources of saving available to the economy change little from the solution where we reach world prices by 1986. What is most striking is that we see a decrease in personal saving by approximately $3 billion and

an increase in government saving by approximately $1.8 billion. We also see an increase in foreign saving. This pattern for the personal saving rate, however, does not provide a picture which is much different from that observed in the higher crude petroleum price solutions. We still see continued higher rates of inflation, large government deficits, large trade deficits and poor growth in productivity.

III G.3 Labour Market Issues

In the early and mid 1980's, as Canada moves its domestic energy prices to world level, we anticipate that real income will be lower as a consequence. One of the uncertainties that we face is the extent to which income earning groups (wage earners in particular) will resist downward pressure on real income in the face of rapidly increasing energy prices. Wage earners might bargain more vigorously for higher money wages in the face of higher energy prices.

We have used CANDIDE Model 2.0 to test the implications of such behaviour. A simulation is designed which gives more weight to energy prices in the process by which price expectations are formed. This simulation implies that wage earners would be partially successful in offsetting real wage losses stemming from higher energy costs. In this

simulation, wage earners would be able through vigorous wage bargaining to cushion the decline in the rate of increase in the real wage. The results suggest that vigorous bargaining on the part of wage earners will add additional inflationary pressures to the economy. The gains in real income on the part of wage earners are not without increases in the inflation rate.

This can be seen by comparing the consumer price index, the real wage rate and the nominal wage rate in Table 3-15. By 1983, in the more vigorous wage bargaining solution, nominal wages are growing at a rate of 11.7 per cent. This is 1.3 per cent more than the parity by 1986 solution. However, real wages are above the control solution by .8 per cent. This implies (in 1983) that the consumer price index has risen by .4 per cent above the solution where we reach world prices by 1986. The heightening of inflationary expectations is a considerable source of risk in the early and mid-1980's. However, if one compares the major indicators including the government deficit position, the trade balance, growth and inflation, we find all the major imbalances still exist with the additional risk that inflation rates may be higher.

III G.4 Energy Investment

The fourth area of uncertainty is related to the magnitude of energy investment that a rapid movement to world crude petroleum prices might elicit. In our previous oil price scenarios, there are a number of assumptions associated with energy investment. Given the federal government announced policy to obtain self reliance by 1990, we have developed a solution using CANDIDE Model 2.0 which increases energy investment over and above that assumed in the solution where we reach world prices by 1986. This simulation includes the development of the Cold Lake project, increased development of enhanced oil, completion of the Q & M pipeline project to Quebec City, and increased licensing of natural gas exports resulting from increased supplies.

To be specific we have assumed the following. The initial development of the Cold Lake tar sand plant is assumed to begin in 1982, with peak development in the 1985-86 period. Increased development of enhanced oil is assumed to result in the supply of 140 million barrels per year by 1985 (15 million above the parity by 1986 solution). This is a cumulative increase in crude petroleum supply during the projection period of over 100 million barrels. The peak period for this source of supply is estimated to be in the early 1990's, well beyond the scope of the projection period. These two assumptions cumulatively increase

investment in the industry by 2.3 billion (1971 $) during the 1980-85 period. We also assume that the Quebec City portion of the Q & M pipeline project extending natural gas supply from Montreal to the East Coast will be built. This results in additional pipeline investment of approximately 800 million dollars (1971 $).

Due to the incentive of increased markets for natural gas, production from the established producing areas is assumed to increase during the 1982-85 period. Additional natural gas exports are licensed and consumer demand for natural gas is assumed to grow at an increasing rate during the 1980-85 period reflecting increased availability. The increased supplies of natural gas, an alternative form of energy, coupled with additional supply of enhanced oil, result in a reduction in crude oil imports. This results in a reduction in oil import subsidies during the 1980-85 period. Provincial royalties increase reflecting the additional production of crude petroleum and natural gas and increased natural gas exports. In this solution, we see the expected result -- increased real economic growth, lower unemployment rates, higher price levels, reduced government deficits, and a considerably reduced current account deficit due to a reduction of energy imports and an increase in energy exports.

Except for the improvement in our energy balance of trade, implying a total improvement in our balance of payments position from the solution which reaches world prices by 1986, we still see high inflation rates, persistent federal deficits, large provincial surpluses and a weak but improved balance of payments position. The swing in the energy balance is quite clear in Table 3-15. By 1985, in the solution where we reach world price by 1986, our energy balance is negative and equal to approximately .7 per cent of current dollar GNE. In the more energy investment scenario, the energy balance is positive and equal to approximately .6 per cent of current dollar GNE. Although the additional energy investment scenario implies higher levels of activity which worsen the non energy balance of payments, the improvement in our energy balance of payments strengthens our overall balance-of-payments position considerably.

We have examined four areas of uncertainty: two associated with labour markets, one associated with consumer behaviour, and one associated with producer behaviour. An examination of these results reveals a singularly robust story. Few suggest that dramatic improvements will occur if these uncertainties are borne out as facts. Some suggest that additional inflationary pressures may bubble to the surface. Only in one case do we get a dramatic improvement (additional energy investment and its impact on the trade balance). The large federal deficits, the persistent

imbalance of trade, the upward pressure on inflation rates, the low growth of productivity, and the reduced rate of growth of output are all robust features of the economic terrain in all four of these cases.

SECTION IV

IV The Isolated Impacts of Policy Instruments

In Section III, we considered the sensitivity of a selected set of economic indicators to various assumptions concerning the relationship of domestic crude petroleum prices to world levels. Before considering new policy packages that might improve the anticipated performance of the Canadian economy in the early 1980's, we deal with the impacts associated with six alternative policies, each in isolation. If one were to consider policy packages without outlining the isolated impacts that an individual policy might have on the path of the Canadian economy during this period, it would make the interpretation of the results less revealing. The examination of isolated policies in anticipation of examining policy packages is done to increase understanding of how new policy packages might influence Canadian economic performance.

When studying the isolated impact of fiscal and monetary policies, we again begin with a base solution. In Section III, we chose not to single out any one simulation as the most likely, but only to indicate the impact of domestic crude petroleum price adjustment in an environment free from any new policy initiatives. In this

section, we choose as a reference point the path for the Canadian economy implied by the case where domestic crude petroleum prices reach world parity by 1986. It is within this economic environment that we consider the impact of six isolated policy instruments. The six policy instruments include (1) the mortgage interest and property tax credit; (2) a lower rate of growth of money supply; (3) an increase in the investment tax credit, (4) a reduction in the corporate tax rate; (5) an increase in personal taxes and (6) a decrease in personal taxes.

IV A Mortgage Interest and Property Tax Credit

There has been renewed interest in amending the personal income tax laws in Canada in an effort to provide relief for the burdensome cost of homeownership. Recently, the Government of Canada has announced that it intends to allow taxpayers, who are homeowners, a residential mortgage interest payment and property tax credit. The tax credit will include 25 per cent of the first $5,000 of interest paid on residential mortgages, to a maximum credit of $1,250 per year. In addition, the credit is to include a $250 per year reduction in personal taxes per homeowner for property taxes. The mortgage interest and property tax credit program is to be phased in over four years beginning in 1979, when homeowners will be allowed to deduct a maximum interest credit of $312.50 and a maximum property tax credit of

$62.50. The government expects this plan to provide stimulus to residential construction, and if there are no offsetting tax increases, to provide general stimulus to the economy.

Using as the reference case the solution in which crude petroleum prices reach world parity by 1986 and imposing a 9 per cent monetary growth rule, we have developed a simulation which incorporates the above changes to government policy in CANDIDE Model 2.0. Let us first discuss the way these changes are imposed upon the Parity 1986 solution.

Because the mortgage interest and property tax credit scheme represents a reduction from basic federal tax, it is easy to introduce the revenue loss associated with the program. In the first year of the program, the Department of Finance anticipates that the revenue loss will be $575 million. Using estimates for housing stock of singles in 1979 of 4.594 million, the average deduction per single house is then $125. The maximum credit deductible during the first year of the program is $375. The effective deduction is then 33 per cent of the maximum deduction. Using the maximum credit phasing path of $375, $750, $1,125, and $1,500 during the period 1979 through 1982, raising the effective reduction as a percentage of maximum deduction during this period from 33 per cent to 39 per cent and

accounting for the growth in single housing stock during this period, we estimate that the revenue loss in 1980 will be $1.2 billion, $2 billion in 1981, and $2.8 billion in 1982. The Department of Finance estimates that if the program was fully implemented in 1979, the immediate revenue loss would be $2,250 million. The calculation which we have presented indicates that, as a result of increases in the effective reduction and increases in the stock of housing between now and 1982, an additional revenue loss of $600 million will occur beyond the impact resulting from immediate and full implementation. During the period 1983, 1984 and 1985, the revenue loss will increase from $2.8 billion to $3.4 billion as a result of increases in the stock of housing and a leveling off of the effective reduction at 42 per cent. Using these estimates of tax revenue loss, we have reduced personal income tax collections at the federal level by the amount recorded in column 4 of Table 4-1.

The tax credit will stimulate residential construction and cause a substantial increase in the demand for both NHA and conventional mortgages. The increased demand will cause mortgage rates to increase relative to other long-term interest rates. The mortgage approval equations in CANDIDE Model 2.0 are used to develop the needed upward adjustment to conventional and NHA mortgage rates. These are recorded in Table 4-2 below.

Table 4-1

Direct Revenue Loss From Mortgage Interest and Property Tax Credit

	Maximum Credit ($)	Effective Credit ($)	Stock of Single Houses (millions)	Revenue Loss (millions)
1979	375	125.00	4,594	575
1980	750	262.50	4,702	1,234
1981	1,125	416.25	4,804	1,999
1982	1,500	585.00	4,909	2,872
1983	1,500	630.00	5,009	3,156
1984	1,500	630.00	5,118	3,224
1985	1,500	630.00	5,230	3,394

Source: Estimates by Department of Finance and Economic Council of Canada.

Table 4-2

Adjustments to Mortgage Interest Rates

	NHA	Conventional
	(per cent)	
1980	.070	.070
1981	.20	.20
1982	.40	.40
1983	.67	.67
1984	.97	.97
1985	1.07	1.07

Source: Estimates by Economic Council of Canada.

The proposed plan will also reduce home ownership costs relative to rental costs and this will result in increased demand for housing. Using estimates of the impacts of this plan on both the homeownership and the rental price deflators in CANDIDE Model 2.0, we have calculated a set of housing starts adjustments.

In computing the necessary adjustments to housing starts, we have made use of the estimated parameter of the relative price variable in the single housing starts equation. In the single housing starts equation, the homeownership costs relative to the cost of renting enters with a negative sign. The proposed housing plan will reduce the cost of homeownership relative to renting, resulting in additional housing starts (particularly single). When computing the additional housing starts, we have also had to make assumptions about the time phasing of the program, the average marginal tax rate and the average share of mortgage interest and property tax in the homeownership cost. In the Parity by 1986 case, the average mortgage is approximately $40,000 in 1979. At a 11 per cent mortgage rate, the annual mortgage interest is approximately $4,400. This implies that when the program is fully effective, the average household with a mortgage will be able to deduct close to the maximum for tax purposes. Given these assumptions, we have computed the per cent savings in mortgage interest and property taxes over time, assuming an average marginal tax rate of 30 per cent. Given the percentage

of mortgage interest and property tax saved, we have computed the per cent reduction in home ownership costs to the representative household by multiplying this series by the share of property taxes and mortgage in total homeownership cost for the representative household. We have assumed that this share is .85. Using this information on the per cent reduction in homeownership costs, we have computed the upward adjustment to the single housing starts equation as recorded in Table 4-3.

Table 4-3

Adjustments to Housing Starts (Singles)

(Thousands)

1980	6
1981	11
1982	17
1983	18
1984	23
1985	23

Source: Estimates by Economic Council of Canada

The impact of the mortgage interest and property tax credit program on a selected set of economic indicators is recorded in Table 4-4. Let us consider in detail the impact on: (1) government cash requirements; (2) real economic growth; (3) labour supply and labour demand; (4) wages and prices, and (5) the trade balance and the exchange rate. The tax credit plan is expected to stimulate residential construction by reducing the cost of homeownership relative to renting. Consumption will also increase because the tax cut increases real disposable income. However, increases in real output through the multiplier-accelerator effect might be restrained by rising prices and higher interest rates. Pressure on interest rates is derived from increased mortgage demand and by the federal government which finances the revenue loss by issuing more debt. Prices rise because of increased pressure on labour markets, increased capital costs and depreciation of the Canadian dollar.

The negative adjustments to federal personal income tax collections increase from $575 million in 1980 to $3,224 million in 1985. However, the total revenue loss accounting for all indirect effects at all levels of government is much less. The total direct tax loss to the federal government by 1985 is $3,224 million. However, the federal deficit position worsens by only $1,857 million. The provincial surplus increases by $1,248 million. Thus the total deficit position of both the federal and provincial governments deteriorates by only $623 million. The tax cut stimulates the economy and produces

additional revenues from all sources (sale taxes, corporate profit taxes, and additional personal tax collections to the provinces). This moves the provincial sector into a stronger surplus position and substantially reduces the financial pressures caused by the tax credit program. By 1985, the additional demand for funds by all levels of government is only one-fifth of the estimated cost of the plan and therefore, there is much less pressure on financial markets than might be anticipated given estimates of only the direct revenue loss. The federal government must still find two billion in 1985 to finance the program. However, when viewed within the context of the total government deficit position, there is a substantial reduction from the direct revenue loss. On the other hand, in the base case world parity by 1986, the federal government during this period is already running substantial deficits. The increase in federal financial requirements should also be viewed from an already weak federal deficit position.

The induced increase in housing starts and the increase in personal disposable income produces higher real output as we move forward from 1980. By 1985, real GNE is 2.2 billion higher in real terms that it would have otherwise been. In viewing the results in Table 4-4, one can see that in the period in which the program is phased in (1979-82), the growth rate in real GNE increases approximately three-tenths of a percentage point on average.

Table 4-4

Selected Indicators -- Isolated Impacts of Policy Options

	1980	1981	1982	1983	1984	1985
	(percentage rate of increase)					
GROSS NATIONAL PRODUCT (1971$)						
86 Parity	2.7	4.6	4.5	3.0	3.3	3.0
Mortgage and Property Tax Credit	2.9	4.9	4.9	3.3	3.5	3.1
Lower Money Supply	2.2	4.5	4.0	2.9	3.1	3.0
Investment Tax Credit	2.9	4.9	4.7	3.2	3.4	3.1
Corporate Tax Reduction	2.8	4.9	4.7	3.3	3.4	3.0
Personal Tax Increase	2.7	3.5	4.3	2.5	3.1	2.8
Personal Tax Cut	2.7	5.1	4.6	3.2	3.4	3.0
CONSUMER PRICE INDEX						
86 Parity	8.6	8.5	8.5	9.0	8.3	8.0
Mortgage and Property Tax Credit	8.6	8.5	8.7	9.2	8.7	8.4
Lower Money Supply	8.3	8.6	8.5	8.7	8.1	7.7
Investment Tax Credit	8.3	8.4	8.5	9.1	8.5	8.2
Corporate Tax Reduction	8.6	8.4	8.4	9.0	8.5	8.2
Personal Tax Increase	8.6	8.4	8.3	8.6	8.0	7.7
Personal Tax Cut	8.6	8.5	8.6	9.1	8.5	8.2
UNEMPLOYMENT RATE (LEVEL)						
86 Parity	7.8	6.9	5.9	5.4	5.3	5.3
Mortgage and Property Tax Credit	7.7	6.7	5.6	5.0	4.8	4.8
Lower Money Supply	7.9	6.9	6.0	5.5	5.3	5.0
Investment Tax Credit	7.8	6.8	5.7	5.2	5.0	4.9
Corporate Tax Reduction	7.7	6.8	5.7	5.1	4.9	4.9
Personal Tax Increase	7.8	7.3	6.3	6.0	5.9	6.0
Personal Tax Cut	7.8	6.7	5.7	5.2	5.0	5.0
LABOUR FORCE						
86 Parity	2.1	1.8	1.7	1.7	1.8	1.8
Mortgage and Property Tax Credit	2.1	1.9	1.8	1.8	1.9	1.8
Lower Money Supply	2.1	1.8	1.6	1.5	1.6	1.6
Investment Tax Credit	2.2	1.8	1.8	1.7	1.8	1.8
Corporate Tax Reduction	2.1	1.8	1.8	1.7	1.8	1.8
Personal Tax Increase	2.1	1.5	1.5	1.4	1.8	1.7
Personal Tax Cut	2.1	2.0	1.8	1.8	1.8	1.8

Table 4-4 (cont'd)

	1980	1981	1982	1983	1984	1985
	(percentage rate of increase)					
EMPLOYMENT						
86 Parity	2.1	2.8	2.8	2.2	2.0	1.8
Mortgage and Property Tax Credit	2.2	3.0	3.0	2.4	2.1	1.8
Lower Money Supply	2.0	2.8	2.6	2.2	1.8	2.0
Investment Tax Credit	2.1	2.9	2.9	2.3	2.0	1.9
Corporate Tax Reduction	2.1	2.9	2.9	2.3	2.0	1.8
Personal Tax Increase	2.1	2.1	2.6	1.8	1.9	1.6
Personal Tax Cut	2.1	3.1	2.9	2.3	2.0	1.9
PRODUCTIVITY						
86 Parity	0.8	1.8	1.7	0.9	1.8	1.6
Mortgage and Property Tax Credit	0.9	1.9	1.8	1.0	1.8	1.7
Lower Money Supply	0.5	1.6	1.4	0.7	1.6	1.4
Investment Tax Credit	1.0	1.9	1.8	1.0	1.8	1.7
Corporate Tax Reduction	0.9	2.0	1.8	1.0	1.8	1.7
Personal Tax Increase	0.8	1.2	1.8	0.8	1.6	1.6
Personal Tax Cut	0.8	2.1	1.7	1.0	1.8	1.6
REAL WAGE RATE						
86 Parity	0.5	0.7	1.1	1.3	2.5	2.6
Mortgage and Property Tax Credit	0.5	0.7	1.1	1.4	2.8	2.9
Lower Money Supply	0.5	0.2	0.5	0.7	1.9	2.0
Investment Tax Credit	0.8	0.6	1.1	1.4	2.7	2.8
Corporate Tax Reduction	0.5	0.8	1.3	1.4	2.7	2.9
Personal Tax Increase	0.5	0.8	1.1	1.3	2.3	2.3
Personal Tax Cut	0.5	0.7	1.1	1.4	2.7	2.8
NOMINAL WAGE RATE						
86 Parity	9.1	9.2	9.8	10.4	11.1	10.9
Mortgage and Property Tax Credit	9.1	9.3	9.9	10.8	11.7	11.6
Lower Money Supply	8.9	8.9	9.1	9.5	10.1	9.8
Investment Tax Credit	9.1	9.1	9.8	10.6	11.4	11.2
Corporate Tax Reduction	9.1	9.2	9.8	10.5	11.4	11.3
Personal Tax Increase	9.1	9.3	9.5	10.0	10.4	10.2
Personal Tax Cut	9.1	9.2	9.9	10.6	11.4	11.2

Table 4-4 (cont'd)

	1980	1981	1982	1983	1984	1985
	(percentage rate of increase)					
SAVING RATE (LEVEL)						
86 Parity	10.1	9.7	9.4	9.0	8.9	8.9
Mortgage and Property Tax Credit	10.2	9.8	9.6	9.3	9.1	9.0
Lower Money Supply	10.3	9.6	9.3	8.9	8.8	8.6
Investment Tax Credit	10.2	9.8	9.4	9.1	9.0	9.0
Corporate Tax Reduction	10.2	9.8	9.5	9.1	9.0	9.0
Personal Tax Increase	10.1	9.1	8.8	8.8	8.7	8.7
Personal Tax Cut	10.1	9.9	9.6	9.1	9.0	8.9
PARTICIPATION RATE (LEVEL)						
86 Parity	60.8	61.0	61.3	61.6	62.0	62.4
Mortgage and Property Tax Credit	60.8	61.1	61.4	61.8	62.2	62.6
Lower Money Supply	60.8	61.0	61.2	61.5	61.7	62.0
Investment Tax Credit	60.8	61.0	61.3	61.7	62.0	62.5
Corporate Tax Reduction	60.8	61.0	61.3	61.7	62.1	62.5
Personal Tax Increase	60.8	60.8	61.0	61.1	61.5	61.9
Personal Tax Cut	60.8	61.1	61.4	61.8	62.2	62.6
REAL INVESTMENT (% OF REAL GNE)						
86 Parity	21.6	22.1	22.5	22.7	22.8	22.8
Mortgage and Property Tax Credit	21.7	22.3	22.8	23.0	23.2	23.2
Lower Money Supply	21.5	21.9	22.2	22.2	22.4	22.4
Investment Tax Credit	21.7	22.3	22.9	23.1	23.3	23.3
Corporate Tax Reduction	21.7	22.4	22.8	23.1	23.3	23.2
Personal Tax Increase	21.6	22.2	22.4	22.5	22.6	22.6
Personal Tax Cut	21.6	22.1	22.6	22.8	22.9	22.9
FEDERAL DEFICIT (% OF GNE)						
86 Parity	-4.3	-3.7	-3.0	-2.7	-2.4	-2.1
Mortgage and Property Tax Credit	-4.4	-3.8	-3.2	-3.0	-2.7	-2.4
Lower Money Supply	-4.8	-4.3	-3.7	-3.5	-3.3	-3.0
Investment Tax Credit	-4.8	-4.1	-3.4	-3.1	-2.9	-2.7
Corporate Tax Reduction	-4.8	-4.1	-3.4	-3.1	-2.7	-2.5
Personal Tax Increase	-4.3	-2.6	-1.9	-1.6	-1.3	-1.0
Personal Tax Cut	-4.3	-4.1	-3.4	-3.1	-2.7	-2.5

Table 4-4 (cont'd)

	1980	1981	1982	1983	1984	1985
	(percentage rate of increase)					
PROVINCIAL SURPLUS (% OF GNE)						
86 Parity	0.9	1.4	1.6	1.9	1.6	1.5
Mortgage and Property Tax Credit	0.9	1.4	1.7	2.0	1.8	1.7
Lower Money Supply	0.9	1.4	1.6	1.9	1.7	1.7
Investment Tax Credit	0.9	1.4	1.7	2.0	1.7	1.7
Corporate Tax Reduction	0.9	1.4	1.7	2.0	1.7	1.7
Personal Tax Increase	0.9	1.2	1.3	1.5	1.2	1.2
Personal Tax Cut	0.9	1.4	1.7	2.0	1.7	1.7
BALANCE OF PAYMENTS CURRENT ACCOUNT BALANCE (% OF GNE)						
86 Parity	-1.8	-1.8	-2.2	-2.1	-2.5	-2.7
Mortgage and Property Tax Credit	-1.9	-2.0	-2.5	-2.5	-2.9	-3.1
Lower Money Supply	-2.2	-2.3	-2.6	-2.4	-2.7	-2.9
Investment Tax Credit	-1.9	-2.0	-2.5	-2.4	-2.8	-3.0
Corporate Tax Reduction	-1.9	-2.0	-2.5	-2.4	-2.8	-3.0
Personal Tax Increase	-1.8	-1.4	-1.7	-1.4	-1.8	-1.9
Personal Tax Cut	-1.8	-2.0	-2.4	-2.4	-2.8	-3.0
ENERGY BALANCE OF PAYMENTS[1] (% OF GNE)						
86 Parity	1.0	0.9	0.4	0.1	-0.4	-0.7
Mortgage and Property Tax Credit	1.0	0.9	0.4	0.1	-0.4	-0.7
Lower Money Supply	1.0	0.9	0.4	0.1	-0.4	-0.7
Investment Tax Credit	1.0	0.9	0.4	0.1	-0.4	-0.7
Corporate Tax Reduction	1.0	0.9	0.4	0.1	-0.4	-0.7
Personal Tax Increase	1.0	0.9	0.4	0.1	-0.4	-0.7
Personal Tax Cut	1.0	0.9	0.4	0.1	-0.4	-0.7
NON ENERGY BALANCE OF PAYMENTS (% OF GNE)						
86 Parity	-2.9	-2.8	-2.6	-2.2	-2.1	-2.0
Mortgage and Property Tax Credit	-2.9	-2.9	-2.9	-2.6	-2.5	-2.4
Lower Money Supply	-3.2	-3.2	-3.0	-2.5	-2.3	-2.2
Investment Tax Credit	-2.9	-2.9	-2.9	-2.5	-2.4	-2.3
Corporate Tax Reduction	-2.9	-3.0	-2.9	-2.5	-2.4	-2.3
Personal Tax Increase	-2.8	-2.3	-2.1	-1.5	-1.4	-1.3
Personal Tax Cut	-2.8	-2.9	-2.8	-2.5	-2.4	-2.3

1 Includes crude petroleum and products, natural gas and electricity.

Source: CANDIDE Model 2.0.

The impact that the mortgage interest and property tax credit program has on labour supply and labour demand is also important. Increased output levels produce additional jobs. By 1985, the program has produced approximately 100,000 new jobs (direct plus indirect) in the economy. However, the impact that the program has on the after tax real wage provides for increased opportunity in real income growth (after tax) which stimulates entry into the labour force. By 1985, there are 55 thousand more participants in the labour force than there would have been otherwise. These labour supply and labour demand effects provide for a reduction in the unemployment rate by about five-tenths of a percentage point. In the solution in which crude petroleum prices reach world parity by 1986, unemployment rates level off in the 5.3 per cent range. In the solution where the mortgage interest and property tax credit program is also included, the unemployment rate levels off at 4.8 per cent in the 1984-85 period.

The impact that the credit program has on wages and prices can be traced to increased pressure in both product and factor markets as a result of higher levels of activity. By the end of the period, the consumer price index has associated with it inflation rates that are in the 8.5 per cent range rather than in the 8 per cent range. By 1985, the consumer price index is higher in the tax credit solution than in the parity by 1986 solution. Additional pressure on prices is also related to a slight depreciation in the Canadian dollar.

The impact that the tax credit program will have on the balance of payments follows from the impact that the program has on real disposable income and its secondary effects on consumption. In the parity by 1986 solution, the current account balance as a per cent of GNE levels off in the 2.5 to 2.7 per cent range by 1984-85. In the mortgage interest and property tax credit solution, the current account as a per cent of current dollar GNE rises above 3 per cent in 1985. This represents a deterioration in the trade balance of approximately 2.5 billion dollars as a result of additional consumption spending stemming from increased disposable income.

In summary, the tax credit plan leads to increased housing and real consumption spending. Real GNE is above the base case solution by approximately 2.2 billion in 1985. Employment and labour supply increases but the unemployment rate is lower. The combined additional government financing requirements are far less than the revenue loss suffered by the federal government. This is because the economic stimulus produced by the plan generates additional revenues at all levels of government. The provincial governments do well in this area. However, the federal government must finance the program and additional federal debt by 1985 amounts to 7.1 billion dollars. This must be viewed in combination with debt not issued by the provinces as a result of being in a better surplus position.

Provinces issue 4.1 billion dollars less debt. This implies a total increase in net indebtedness at all levels of government of only 3 billion dollars.

IV B More Restrictive Growth of Money Supply

In the simulations described in Section III, the average annual rate of inflation in the higher priced crude petroleum solutions is approximately 8.5 per cent during the period 1980 through 1985. The general assumptions used in these simulations discussed in Section III include a target growth rate for the narrowly defined money supply (M1) of 9 per cent per annum. In view of the wide spread and well justified concern about inflation, we have also investigated the impact of a lower growth target for the money supply. The simulation discussed here uses as a base case the solution which reaches crude petroleum price parity by 1986, with the exception that the 9 per cent annual rate of increase in the narrowly defined money supply is replaced by a 6 per cent growth target for the money supply.

We introduce the following changes to accomplish this task. We exogenize the equations for (1) currency held by the public and (2) demand deposits. The path for these two variables has been set at a 6 per cent growth rate target. Since the short-term interest rate equation (the finance

company paper rate) in CANDIDE Model 2.0 is specified as a Bank of Canada reaction function, an exogenously imposed decrease in money supply growth will not increase the short rate by the desired amount. Using an alternative short rate equation (a renormalized demand for money function in the asset portfolio model), we derive the necessary upward adjustment for the short-term interest rate which is consistent with a sustained reduction in the money supply growth of 3 per cent.

In CANDIDE Model 2.0, the spot exchange rate reacts to decreases in M1 via expected inflation. A decrease in the money supply growth will decrease expected inflation with a two year lag. Expected inflation influences the expected exchange rate and the latter in turn influences the spot exchange rate. However, the exchange rate appreciation due to a decrease in money supply growth may be underestimated. The weak response of the exchange rate to changes in monetary growth rates could be attributed to the following factors. The rate of money supply growth in the price expectation equations could be too small, or the coefficient of relative inflation rates in the expected exchange rates equation could be too small. Also, the long-run response of prices to wages could be too weak (it takes 2 to 4 years for the long-run impact of wages on prices to build up). In view of these caveats, we have made adjustments to the exchange rate equation directly, adjusting the exchange rate upward in this solution.

The standard cost of capital approach indicates that a decrease in money supply growth will raise the short-term interest rate. This induces a lesser increase in long-term rates. The increase in long-term rates will increase the user cost of capital resulting in a decrease in non residential investment and GNE. The cost of credit will influence the housing market as well. The increase in mortgage rates depresses housing starts and brings about a reduction in the growth of residential investment. The lowering of money supply also reduces mortgage availability through a reduction of the earning assets of chartered banks and other financial institutions. This in turn further depresses housing starts and reduces growth in residential investment. In the short run, a decrease in the money supply decreases investment spending and will generate the standard multiplier consequences on other components of final demand (consumption, imports and government expenditures). The first year effects can be seen by examining the impact on GNE growth rates in 1980 (Table 4-4). GNE growth is considerably reduced.

An investment-led retardation of growth will depress labour productivity. This results from short-run decreasing returns to labour as well as substitution of labour for capital. Furthermore, the value-added prices (by industry) are negatively related to productivity, therefore a reduction in productivity will put upward pressure on prices. Finally, an increase in interest rates will also induce an increase in the

cost of capital putting further upward pressure on prices. These are the short-run impacts to a reduction in the rate of growth of the money supply.

In the long run, there are other consequences. The impact of a reduction in the rate of growth of money supply on price expectations builds up over a period of 2 years. Lower price expectations cause wage rates to fall. Lower growth in wages, with a lag, reduces industry prices because of reduced unit labour costs. This in turn will put downward pressure on all final demand prices, increasing real income in the economy and exerting some upward pressure on the growth of GNE. The lowering of GNE prices will also put some downward pressure on interest rates and increase investment in the second and subsequent rounds.

Expectations of lower inflation induced by a reduction in monetary growth cause the exchange rate to appreciate which in turn results in lower import and export prices (expressed in Canadian dollars). The decrease in these prices puts downward pressure on all domestic prices. The appreciation of the dollar reduces exports and encourages imports. However, the lower level of activity induced by lower investment and lower incomes will depress imports. Thus the net effect on imports and the current account balance of payments depends upon the relevant elasticities. In the current simulation, it appears that the income effect

outweighs the substitution effect and as a result, we see an improvement in the Canadian balance-of-payments position.

The dynamics of the wage price mechanism determine the movement of the real wage. The impact of lower monetary growth on the unemployment rate is influenced by a reduction in labour supply induced by lower real wage growth (wages fall faster than prices). The initial reduction in real wages induces people to withdraw from the labour market (particularly members of the secondary labour force). When this result is combined with the demand side effect, little change results in the unemployment rate. This in turn will weaken the wage price dynamics. This short summary gives an explanation of the various mechanisms at work within CANDIDE Model 2.0 which account for the various responses obtained in this isolated policy experiment.

We analyse the results in some detail under the following major groups: (1) GNE growth; (2) wages and prices; (3) labour supply and labour demand; (4) money supply and interest rates; (5) trade balance and exchange rates, and (6) the government budget position.

Due to the reduction in capital formation, GNE is 1.3 per cent below the parity by 86 solution at the end of the

simulation period. This represents a loss in GNE of 2.1 billion dollars. In response to increases in the user cost of capital caused by higher interest rates, business investment declines relative to the parity by 1986 solution. Gross fixed capital formation falls 1.2 per cent below the control in the initial year and this reduction builds to 3.5 per cent by the end of the simulation period. In Table 4-4, real investment as a percentage of GNE falls from 22.8 per cent in the base case to 22.4 in the lower money growth alternative. This is a considerable reduction. Due to the increase in the cost of credit (increase in the mortgage rate) and to the decrease in the availability of credit (through the reduction in mortgage approvals), total housing starts are reduced by 7,000 units in 1980.

Growth in labour productivity declines for two reasons: (1) decreasing returns to labour during a period of sluggish economic growth and (2) substitution of labour for capital caused by increases in the user cost of capital. By the end of the simulation period, productivity growth is below the base case. This can be seen in Table 4-4.

Price expectations as a result of reduced money supply growth decline by .2 per cent initially. However, expectations decelerate over time and by 1985, inflation expectations are reduced by 1 percentage point per annum.

Because of the reduction in inflation expectations throughout the simulation period and because of the increase in the unemployment rate in the earlier period, nominal wage rates are reduced substantially below the base case. By the end of the simulation period, the average hourly wage is 3.7 per cent below the base case.

This reduction in wages coupled with a reduction in the prices of internationally traded goods (due to the appreciation of the Canadian dollar) causes lower prices to occur throughout the system. However, the reduction in prices is not as large as the reduction in wages, resulting in a reduction in real wages.

By the end of the simulation period, both labour force and employment are reduced. However, the decrease in employment is less than half the decrease in labour force and, as a result, the unemployment rate is reduced. The reduction in the real wage has decreased labour supply by reducing secondary participation rates. The reduction in employment is caused by lower real economic activity.

All interest rates in the low money growth solution are above the solution where Canada reaches parity in crude petroleum prices by 1986 under the assumption of a 9 per cent growth path of money supply. In the lower money growth

alternative, the short rate is 230 base points higher by 1985 than in the base case. As expected, the increase in long rates is not as large as the increase in short rates. The long rates increase by only 90 basis points. As a result of weak response of prices to wages, there is not much second round downward pressure on interest rates. If prices were more responsive to wages, the initial increase in interest rates would be offset by the latter reductions. Moreover, increases in federal government debt hold interest rates above the base case.

The overall government budget position deteriorates. The effect of higher interest rates and lower tax revenues caused by lower real economic activity and lower prices brings about an increase in the government deficit position. By 1985, the overall government deficit position is 2.8 billion higher than in the control and the additional federal government debt outstanding is 15.4 billion more.

IV C Comparative Effects of a Corporate Tax Cut and an Increased Investment Tax Credit

We have used CANDIDE Model 2.0 to study and compare the medium-term effects of the two corporate tax policy changes: (1) a corporate tax cut and (2) an increase in the investment tax credit. To facilitate a comparison of the simulation results, the two alternatives each imply a first year revenue loss in 1980 of 1.5 billion dollars (the reduction in tax

revenues from the base case, parity by 1986). These alternatives are also run under the assumption of a nonaccommodating monetary policy (that is, the money supply, M1, is exogenised and held at a 9 per cent growth target).

For the corporate tax cut, the revenue loss is achieved by reducing the average federal corporate tax rate by 8 per cent and making appropriate adjustments to the industry effective tax rates. These adjustments are continued during the period 1981-85. For the investment tax credit alternative, the revenue loss results from a doubling of the investment tax credit. To maintain model consistency, federal government revenue from direct corporation taxes is reduced over the period 1980-85 by the dollar value of the increased investment tax credits. This accounts for the loss in federal government revenue in the investment tax credit alternative.

IV C.1 The Responses of CANDIDE Model 2.0 to Corporate Tax Policy Changes

Before analyzing and comparing the effects of the two corporate tax policy changes on the Canadian economy during the period 1980-85, it seems appropriate to indicate how we expect CANDIDE Model 2.0 to respond to these policy changes. The tax policy variables (tax credit rates and corporate profits tax rate) all influence the user cost of capital, an important determinant of investment. These policy

instruments used in the above manner will result in a reduction of the user cost of capital by industry. A reduction of the user cost of capital relative to the price of output will result in increased investment. Because of the long lags and the shape of the lagged distributions associated with the user cost variables (the price of output relative to the user cost of capital) in the investment equations, the initial impacts of these policy changes on investment (and GNE) will be small compared to their medium-term impacts. Also, because the lagged distributions associated with the relative price variables are typically shorter in the machinery and equipment investment equations than in the nonresidential construction investment equations, the impact of the tax policy changes will build up faster for machinery and equipment investment than for nonresidential construction investment.

As investment increases, there will be an increase in the growth of the capital stock (as the capital stock increases over time, changes in the desired capital stock or the size of the gap between desired and actual capital stock will become smaller and this will tend to have a depressing effect on investment). This will also lead to an increase in the rate of change of output per manhour (productivity). The growth in GNE brought about by the increase in investment will also bring about growth in real output through the industry output conversion route. This growth in industry output will, in turn, lead to further growth in investment (the accelerator)

which will help to offset the depressing effect on investment as a result of the increased growth in the capital stock over time. The increase in the rate of growth of output per manhour (productivity) will have a tendency to decrease inflation rates.

The impact of these tax policy changes on the unemployment rate will depend on how these policies influence both the supply of labour and the demand for labour. The main determinant of labour supply is the after tax real wage. Since the after tax real wage is not directly affected by these policy changes, we should not expect a very dramatic short-run change in labour supply. However, employment is obtained by dividing manhours by average weekly hours. The main determinants of the former are output and capital stock, while average weekly hours depend on the after tax real wage and, to a lesser extent, on the unemployment rate. The tax policy changes are expected to have relatively large impacts on output and capital stock and a relatively smaller impact on the after tax real wage over the period. This will stimulate employment growth more than labour force growth and the net effect will be a reduction in the unemployment rate.

In assessing the impact of corporate tax policy changes on wages and prices, it is useful to bear the following in mind. In CANDIDE Model 2.0, wages are influenced by an inflation expectation variable and by the reciprocal of

the unemployment rate (prime age working males), which is used as a proxy for labour market tightness. In some cases, we also have influence from U.S. wage rates and industry specific labour productivity. The expectations variable which enters the wage equations is influenced by past rates of change in the consumer price index and in the money supply (M1).

Because the money supply is held at the base case level in these two policy alternatives, the link between the rate of growth of (M1) and inflation expectations is cut. Wages are not affected through this channel. Because each policy change tends to produce a fall in the unemployment rate, as was noted earlier, the labour markets become tighter and this has a general tendency to increase wages and prices (sector prices, final demand prices and CPI, in that order). There are two additional forces which tend to offset this. The increase in the rate of growth of output per manhour has a tendency to reduce inflation rates. The user cost of capital enters as an explanatory variable in some of the price equations. The reduction in the user cost of capital brought about by these policy changes results in a reduction in certain prices and hence tends to lower the inflation rate. These forces counterbalance the effect of labour market tightness. If they are sufficiently strong, there could be a fall in the price level over the medium term.

It is expected that the trade balance will deteriorate because of the high proportion of imports that is usually associated with increased investment and consumption (consumption is expected to increase because of the increase in both real wages and real disposable income). The deterioration in the trade balance will result in a deterioration in the exchange rate.

Since these tax policy changes involve continuing revenue losses, they might lead to increased deficits. These deficits must be financed. This will lead to increased federal debt and interest payments. There will be continuing deterioration in these variables unless the tax policy changes stimulate economy activity to levels which generate sufficient tax revenues to permit a reduction in the deficit. The deficit and debt positions of the federal government will be different from those of the provincial and local governments. For the nonfederal levels of government, higher activity associated with the corporate tax policy changes will result in increased tax revenues. This will have a tendency to reduce nonfederal deficits or increase nonfederal surpluses and reduce nonfederal financial requirements and indebtedness in the long run.

IV C.2 Simulation Results

The results obtained for each of these two corporate tax cut changes are shown in Table 4-4. In view of the previous discussion concerning the expected responses of CANDIDE Model 2.0 to these policy changes, these tables should be easy to interpret. We shall focus on a comparison of the effects of these policies on a selected set of economic indicators. Table 4-4 summarizes the effects of these policies on the most important of these.

The two corporate tax policy changes both result in increases in investment. In the base case solution (parity by 1986), the share of real investment as a percentage of real GNE is 22.8 per cent by 1985. In both alternatives, the share of real investment as a percentage of real GNE increases to 23.3 per cent. An examination of Table 4-4 reveals that the investment response to the two policy alternatives is gradual, approaching a maximum by the end of the simulation period. This response is due to the fact that the user cost of capital variables enter the investment equations with long lags. This suggests that these corporate tax policy changes should not be used for short-run economic stabilization.

The multiplier effect (output to income to consumption) as a result of increased investment activity increases real GNE by approximately 1.6 billion by 1985. In Table 4-4,

we see an increase in the growth rate of real GNE in the period 1981-83 which averages .2-.3 per cent above the base case solution. The base case level of the unemployment rate in 1985 is 5.3 per cent and in each of the alternatives, it falls to 4.9 per cent. Although there is some expansion in the labour force in these two alternatives, most of the decline in the unemployment rate can be attributed to increased labour demand. In both cases, the increase in the number of jobs by 1985 is approximately 58,000 compared to an increase in the labour force of approximately 18,000. Each of these policies provides for an increase in output per manhour over the simulation period of approximately .2 per cent. The increase in output per manhour puts downward pressure on prices and as a result, we see little change in the level of the CPI by the end of the period. In fact, during the period 1980 through 1984, there is downward pressure on prices (when compared to the base case) as a result of increased labour productivity.

The increase in activity levels from these policies is insufficient to generate additional federal revenues to offset the initial and continuing revenue loss associated with these policies. As a result, both policies imply a weakened federal deficit position. This weakened federal deficit position implies additional debt accumulated over the period. Higher levels of activity, as a result of implementing these

policies, however, provide additional revenues to all other levels of government. As a result, the deterioration of the overall government deficit is offset partially by better performance at the provincial, municipal and local levels.

Because of the high import content associated with domestic investment and consumption activity which results through the general multiplier, both of these solutions imply a deterioration in the balance of payments. In both cases, the current account balance has deteriorated by 1985 from 2.7 per cent of GNE to 3 per cent of GNE, with most of the deterioration occuring in the non energy goods component.

IV D The Isolated Impact of Changing Federal-Personal Tax Collections

We use CANDIDE Model 2.0 to study the impact on economic activity of changes in federal personal tax collections. We study two cases wherein federal personal income tax collections are the sole policy instrument. In one case, we study the impact of a personal tax cut with an implied first year federal revenue loss of 2 billion dollars. In the other case, we study the impact of a personal tax increase where the implied first year federal revenue gain is 4.5 billion dollars.

The simulations reported are the outcome of change to the tax rules which govern the collection of federal personal income taxes. The parity by 86 solution used as the base case assumes domestic crude petroleum prices reach world parity by 1986 and is run under the constraint of a 9 per cent money supply rule. We first give a general description of the tax system, including the method by which the federal personal tax changes are implemented.

An individual calculating the amount of personal tax owed to the federal government and owed to provincial governments first arrives at his basic federal tax. Included in this calculation, among other things, are his taxable income and the federal tax schedule. For an individual nonresident in Quebec, the provincial tax is proportional to the basic tax less those credits applicable in the province of residence. Total federal taxes owed are simply the basic tax plus or minus any tax increase or decrease that applies during the tax year. These tax increases or decreases are usually based on the amount of basic tax owed. A resident of Quebec files a separate tax return with the provincial government and in addition, receives an abatement proportional to the basic federal tax owed which reduces the amount of federal tax paid. This method of tax calculation allows the federal government to define the tax base for all provinces except for Quebec and

at the same time allows the two levels of government to separately manipulate their tax take if so desired.

For the solution in which we implemented a tax cut, the following changes were made. In the parity by 1986 solution, the reduction to the basic federal tax was 9 per cent with a minimum of $200 and a maximum of $500 (an individual whose basic tax payable is less than $200 pays no tax). This is the 1978 law, and it was carried forward throughout the projection period. In the tax cut case, we assumed that the reduction in the basic federal tax is increased from 9 per cent to 18 per cent with a minimum of $300 and a maximum of $1,000. This provided for a revenue loss of approximately $2 billion in the initial year of implementation (1981).

The tax increase solution was accomplished by applying a 6 per cent surcharge to basic federal tax payable up to a maximum of $5,600 and a 15 per cent surcharge on the remainder. This resulted in a 4.5 billion dollar revenue gain in the initial year of implementation (1981).

For expository purposes, we will discuss both the tax cut and tax increase cases. However, the magnitude of any changes discussed will be larger for the tax increase than for the tax cut, and this should be borne in mind.

The impact of a tax cut and tax increase on a selected set of economic indicators is shown in Table 4-4. The major impact on the demand side of the model is on personal disposable income which leads to an increase in consumption which, through the GNE multiplier, leads to an increase in GNE. The tax cut is only about half the size of the tax increase. The growth rate for GNE associated with the personal tax cut simulation increases from 4.6 per cent to 5.1 per cent in 1981. However, in the tax increase case, the growth rate declines by almost a full percentage point in the year of implementation (1981).

The impact that these policies have on the federal deficit is also seen in Table 4-4. In the case where personal taxes are increased, we have a considerable reduction in the federal deficit as a percentage of GNE; from 3.7 per cent to 2.6 per cent in 1981. For the personal tax cut case, we have an increase in the federal deficit as a percentage of GNE from 3.7 per cent to 4.1 per cent. In the personal tax increase case, the federal deficit as a percentage of GNE in the long run drops to just above one per cent. In the personal tax cut case, the deficit as a per cent of GNE reaches 2.5 per cent by 1985. Because neither the personal tax cut nor the personal tax increase is offset with any other policy changes, we find that the deficit position of the federal government weakens as a result of the tax cut and is strengthened as a result of the tax increase. We find that the stimulating or depressing

effects that a tax cut or increase has on the provincial surpluses are also borne out in these results. For the case of a tax increase, the provincial surplus deteriorates. In the case of a tax cut, the provincial surplus strengthens. Because of the depressing effect that a tax increase has on consumption and investment, we find that the tax increase case reduces the trade deficit when compared to the reference case. However, the personal tax cut case weakens the Canadian balance of payments position because of induced effects via both consumption and investment.

The impact that these two policies might have on the unemployment rate is quite clear from Table 4-4. These policies bound the base case at the end of the period (1985) with the personal tax increase implying a 6 per cent rate of unemployment, the personal tax cut implying a 5 per cent unemployment rate (the base case implies 5.3 per cent). Because of the induced effects on output, employment and investment in the year of implementation (1981), we see a decline from the base case in labour productivity in the case of a tax increase. In the case of personal tax cuts, we see an increase from the control in labour productivity. For the the remainder of the period, labour productivity growth rates are similar to the base case. This has implications for the policy packages which will be discussed in Section V. It appears that using federal personal tax increases to offset

revenue losses associated with investment incentive policies may imply an initial loss in labour productivity (demand side effect) which must be overcome if the investment incentive policies are to have the desired supply side effects.

SECTION V

V Policy Packages; Medium-Term Prospects and Trade-Offs

V A Introduction

In Section IV, we outline the impact of selected policy alternatives. The policy options in Section IV were run in isolation. It is not clear from such an analysis whether policy combinations might improve the performance of the Canadian economy and at that same time reduce the trade-off issues associated with the individual policy simulations. In the isolated analysis, higher growth in GNE was usually accompanied by higher inflation rates, deteriorating government deficits, and a worsening current account deficit. In Section V, we investigate the possibility that a mixture of policies, both fiscal and monetary, might avoid or reduce the trade-off outcome. The purpose of Section V is to investigate the impact of four policy packages to determine if these trade-offs disappear in the medium run. The policy packages considered are wide ranging. They include at one end of the spectrum a highly stimulative package and at the other end, a restraint package. We also consider two policy packages which lie between these two extremes.

Table 5-1

The Policy Package Content

"The Base Case Solution" for policy analysis

Parity with world price by 1986, mortgage interest and property tax credit, 9 per cent target for growth in money supply.

"The Alternative Policy Packages"

"Highly stimulative": base case solution with the addition of:

(1) Increased investment tax credit - 1980-85 (1.5 billion revenue loss)
(2) Decreased corporate tax rate - 1980-85 (1.5 billion revenue loss)
(3) Personal tax cut - 1981-85 (2.0 billion first year (1981) revenue loss)
(4) 9 per cent target for growth in money supply.

"Stimulative": base case solution with the addition of:

(1) Increased investment tax credit - 1980-85 (1.5 billion revenue loss)
(2) Decreased corporate tax rate - 1980-85 (1.5 billion revenue loss)
(3) 9 per cent target for growth in money supply.

"Stimulative with Offset": base case solution with the addition of:

(1) Increased investment tax credit - 1980-85 (1.5 billion revenue loss)
(2) Decreased corporate tax rate - 1980-85 (1.5 billion revenue loss)
(3) Personal tax increase - 1981-85 (4.5 billion first year (1981) revenue gain)
(4) 9 per cent target for growth in money supply.

"Restraint": base case solution with the addition of:

(1) Personal tax increase - 1981-85 (4.5 billion first year (1981) revenue gain)
(2) 6 per cent target for growth in money supply

Source: Economic Council of Canada.

All policy packages considered in Section V are derived from a base case which includes (1) all assumptions outlined in Section II, (2) the assumptions which provide for parity between domestic and world prices by 1986 and (3) the assumptions required in order to implement the mortgage interest and property tax credit. We have summarized the results associated with these policy packages in Table 5-2. To anticipate a discussion of the results of these policy packages, no particular package offers improvement in all major macro-economic variables. The policy packages, themselves composed of a number of fiscal and monetary initiatives, also exhibit trade-offs.

V B The Design of Policy Packages

It is important to keep in mind that the policy packages all use the the same base case solution. It is useful to review the important features of the base case solution. We have chosen as the base case solution one which assumes world parity in domestic crude petroleum prices by 1986 and implementation of the mortgage interest and property tax credit in 1979 (phased in over four years). This base case solution should not be viewed as a forecast, but as a base against which the various policy packages are to be compared. An assessment of the characteristics of the base case solution used for the policy packages is found in Section IV A of this document. For that reason, we refer you to the

detailed statement in Section IV A for this assessment. The assumptions associated with the four policy packages are recorded in Table 5-1. These include only a mixture of the isolated policies studied in Section IV.

V C Simulation Results

The highly stimulative package and the restraint package are polar opposites. The highly stimulative package encourages investment by the introduction of business tax incentives, encourages consumption via an additional personal tax cut and targets the rate of growth of money supply at the high end of the range which the Bank of Canada is pursuing.

The stimulative package is more moderate than the highly stimulative package. Although the business tax incentives and the 9 per cent target for money supply growth are included, we drop the additional personal tax cut. The offset package with investment stimulus is more moderate than either the highly stimulative or the stimulative package. Here, we have introduced a personal tax increase, the size of which just compensates for loss of federal tax revenues associated with the business tax incentives (increase in the investment tax credit and decrease in the corporate profits tax rate). In the offset package, the tax policy penalizes consumption and encourages investment but leaves the revenue loss to the federal treasury unchanged from the base case

solution. It increases the share of investment and decreases the share of consumption in GNE.

The restraint package does away with the business tax incentives, the rate of growth of the money supply is targeted at the 6 per cent rather than at the 9 per cent rate of increase and the personal tax increase is retained.

In summary, as we move from the highly stimulative to the restraint case, there is downward fiscal and monetary pressure placed upon the economy. However, keep in mind that the mortgage interest and property tax credit has not been removed in any case. Furthermore, the personal tax increase has been designed to compensate for the revenue loss associated with the federal tax cuts directed at stimulating business investment.

V C.1 Analysis of Policy Packages

An analysis of these policy simulations leads us to compare the responses for a selected set of economic variables with the base case solution over time. This set includes the following: (1) GNE growth; (2) consumer price index; (3) real wage; (4) labour productivity; (5) unemployment rate; (6) federal government deficit; (7) provincial government deficit, and (8) balance of payments.

In Table 5-2, we record the results of these four policy packages along with the base case solution and the parity by 86 solution. (Note: the reference solution is derived from the parity by 86 solution by including the assumptions associated with the mortgage interest and property tax credit.)

Across policy packages, the four policies show a monotonic rise or fall with the "highly stimulative" package registering the highest GNE growth rate and the "restraint" package registering the lowest GNE growth rate.

For the consumer price index, all policies show in the early period some decline in the rate of growth of prices. However, by 1985, the more stimulative a policy is, the more the tendency is for prices to rise above the base case solution. In both the "highly stimulative" and the "stimulative package", prices average above 9 per cent in the period 1983-85. The reasons for the decline in the rate of growth of prices (from the base case solution) in the early part of the projection period can be attributed to (1) gains in productivity and (2) a reduction in the user cost of capital due to the tax incentive package. In the offset package, it is clear that gains in productivity due to the investment tax incentives are dissipated by a reduction in

output due to the depressing effects on consumption from increased personal taxes. Without business tax incentives, increased personal income taxes together with restrictive monetary policy offer a result ("restraint") which suggests a seriously eroded productivity performance. It is also important to note that productivity gains registered in the stimulative and highly stimulative cases are soon eroded by pressures on prices emanating from higher wage rates which can be traced to the effects of a tighter labour market. Lastly, it is important to observe that by 1985, the ranking in GNE growth and inflationary pressures for the four policies are in the same order, i.e., higher growth in real GNE is obtained at the expense of more inflationary pressure and conversely.

Interestingly enough, the higher growth, higher inflation correlation and the converse translates weakly into an unemployment-inflation trade-off visible within the policy packages. (Unemployment rates fall as more output is generated and vice versa.) This helps to reinforce the notion that when inflation is generated as a result of normal conditions in product and factor markets, the unemployment-inflation trade-off still exists. This is in contrast to the results cited in Section III where the unemployment-inflation trade-off appeared not to exist in a situation where a large price shock (crude petroleum prices) is imposed on the economic

system. Although these results suggest that lower unemployment will only lead to higher prices and vice versa, the conditions under which this happens should be carefully stated.

The impact of these policy packages on the federal and provincial budget position is significant. The highly stimulative and stimulative packages indicate that economic activity which results from fiscal stimulus never increases to the point where the initial revenue loss is replaced. Furthermore, since the entire cost of these policies is borne by the federal government, the provincial governments are the recipients of a costless fiscal dividend. Stimulative policies, although increasing the federal tax base upon which taxes are levied, do not provide for complete revenue replacement. The provincial governments become the beneficiary of a considerably larger tax base at no cost to their own programs.

It is important to notice that the investment stimulus with offset package provides a growth path for GNE that is very much like that of the base case solution. The federal budget position is also very much like that of the base case solution. However, the ratio of investment to GNE has been increased and the ratio of consumption to GNE has been reduced. There are some early gains in productivity but these are neutralized in 1981 as a result of the revenue offset program (personal tax increase).

The impact of the four policy packages on the balance of payments is equally strong and unequivocal. Higher real growth leads to higher balance of payment deficits and conversely. Higher real consumption growth or higher real investment growth implies a larger import bill.

Finally, in comparing across all packages, it appears that the investment stimulative with offset package comes closest to providing some improvement without increasing the inflation rate, or weakening the federal budget position or the current account balance. However, the price of this particular alternative is extremely high. It involves a large increase in personal taxes which offsets the large reduction in business taxes.

Table 5-2

Selected Indicators -- Policy Packages

	1980	1981	1982	1983	1984	1985
GROSS NATIONAL PRODUCT (1971$)						
86 Parity	2.7	4.6	4.5	3.0	3.3	3.0
Mortgage and Property Tax Credit	2.9	4.9	4.9	3.3	3.5	3.1
Highly Stimulative	3.3	5.9	5.3	3.9	3.8	3.4
Stimulative	3.3	5.5	5.3	3.7	3.7	3.3
Stimulative with Offset	3.3	4.4	5.1	3.1	3.4	3.0
Restraint	2.4	3.7	4.2	2.6	3.1	2.9
CONSUMER PRICE INDEX						
86 Parity	8.6	8.5	8.5	9.0	8.3	8.0
Mortgage and Property Tax Credit	8.6	8.5	8.7	9.2	8.7	8.4
Highly Stimulative	8.2	8.4	8.7	9.6	9.2	9.0
Stimulative	8.2	8.4	8.6	9.4	9.0	8.8
Stimulative with Offset	8.2	8.4	8.4	9.0	8.5	8.3
Restraint	8.3	8.6	8.5	8.6	8.0	7.7
UNEMPLOYMENT RATE (LEVEL)						
86 Parity	7.8	6.9	5.9	5.4	5.3	5.3
Mortgage and Property Tax Credit	7.7	6.7	5.6	5.0	4.8	4.8
Highly Stimulative	7.7	6.3	5.1	4.3	4.0	4.0
Stimulative	7.7	6.5	5.2	4.5	4.2	4.2
Stimulative with Offset	7.7	6.9	5.6	5.0	4.8	4.9
Restraint	7.8	7.1	6.1	5.6	5.5	5.3
LABOUR FORCE						
86 Parity	2.1	1.8	1.7	1.7	1.8	1.8
Mortgage and Property Tax Credit	2.1	1.9	1.8	1.8	1.9	1.8
Highly Stimulative	2.2	2.1	2.0	1.9	1.9	2.0
Stimulative	2.2	1.9	1.9	1.8	1.9	2.0
Stimulative with Offset	2.2	1.6	1.7	1.5	1.9	1.8
Restraint	2.2	1.5	1.5	1.4	1.7	1.6

Table 5-2 (cont'd)

	1980	1981	1982	1983	1984	1985
EMPLOYMENT						
86 Parity	2.1	2.8	2.8	2.2	2.0	1.8
Mortgage and Property Tax Credit	2.2	3.0	3.0	2.4	2.1	1.8
Highly Stimulative	2.3	3.6	3.3	2.7	2.2	2.1
Stimulative	2.3	3.2	3.3	2.6	2.2	2.0
Stimulative with Offset	2.3	2.5	3.1	2.2	2.1	1.7
Restraint	2.1	2.2	2.6	1.9	1.8	1.8
PRODUCTIVITY						
86 Parity	0.8	1.8	1.7	0.9	1.8	1.6
Mortgage and Property Tax Credit	0.9	1.9	1.8	1.0	1.8	1.7
Highly Stimulative	1.3	2.4	2.0	1.2	2.1	1.9
Stimulative	1.3	2.2	2.0	1.2	2.0	1.9
Stimulative with Offset	1.3	1.5	2.0	1.0	1.8	1.8
Restraint	0.6	1.1	1.5	0.7	1.6	1.4
REAL WAGE RATE						
86 Parity	0.5	0.7	1.1	1.3	2.5	2.6
Mortgage and Property Tax Credit	0.5	0.7	1.1	1.4	2.8	2.9
Highly Stimulative	0.8	0.6	1.3	1.6	3.5	3.8
Stimulative	0.8	0.6	1.3	1.5	3.2	3.5
Stimulative with Offset	0.8	0.7	1.2	1.4	2.7	2.9
Restraint	0.5	0.3	0.4	0.7	1.8	1.9
NOMINAL WAGE RATE						
86 Parity	9.1	9.2	9.8	10.4	11.1	10.9
Mortgage and Property Tax Credit	9.1	9.3	9.9	10.8	11.7	11.6
Highly Stimulative	9.1	9.1	10.1	11.4	13.0	13.2
Stimulative	9.1	9.1	10.0	11.1	12.5	12.6
Stimulative with Offset	9.1	9.1	9.7	10.5	11.5	11.4
Restraint	8.9	8.9	9.0	9.4	9.9	9.7

Table 5-2 (cont'd)

	1980	1981	1982	1983	1984	1985
SAVING RATE (LEVEL)						
86 Parity	10.1	9.7	9.4	9.0	8.9	8.9
Mortgage and Property Tax Credit	10.2	9.8	9.6	9.3	9.1	9.0
Highly Stimulative	10.4	10.2	9.9	9.5	9.4	9.4
Stimulative	10.4	10.0	9.7	9.4	9.3	9.3
Stimulative with Offset	10.4	9.4	9.1	9.2	9.1	9.0
Restraint	10.3	9.2	8.9	8.9	8.8	8.5
PARTICIPATION RATE (LEVEL)						
86 Parity	60.8	61.0	61.3	61.6	62.0	62.4
Mortgage and Property Tax Credit	60.8	61.1	61.4	61.8	62.2	62.6
Highly Stimulative	60.9	61.2	61.6	62.1	62.6	63.1
Stimulative	60.9	61.1	61.5	61.9	62.4	62.9
Stimulative with Offset	60.9	60.9	61.2	61.4	61.9	62.3
Restraint	60.9	60.9	61.0	61.2	61.5	61.8
REAL INVESTMENT (% OF REAL GNE)						
86 Parity	21.6	22.1	22.5	22.7	22.8	22.8
Mortgage and Property Tax Credit	21.7	22.3	22.8	23.0	23.2	23.2
Highly Stimulative	21.9	22.7	23.5	23.9	24.1	24.0
Stimulative	21.9	22.7	23.4	23.8	24.0	24.0
Stimulative with Offset	21.9	22.8	23.3	23.7	23.8	23.8
Restraint	21.6	22.0	22.2	22.3	22.4	22.5
FEDERAL DEFICIT (% OF GNE)						
86 Parity	-4.3	-3.7	-3.0	-2.7	-2.4	-2.1
Mortgage and Property Tax Credit	-4.4	-3.8	-3.2	-3.0	-2.7	-2.4
Highly Stimulative	-5.4	-5.2	-4.6	-4.3	-4.0	-3.9
Stimulative	-5.4	-4.8	-4.2	-3.9	-3.6	-3.4
Stimulative with Offset	-5.4	-3.7	-3.1	-2.9	-2.6	-2.3
Restraint	-4.9	-3.4	-2.9	-2.8	-2.5	-2.2

Table 5-2 (cont'd)

	1980	1981	1982	1983	1984	1985
PROVINCIAL SURPLUS (% OF GNE)						
86 Parity	0.9	1.4	1.6	1.9	1.6	1.5
Mortgage and Property Tax Credit	0.9	1.4	1.7	2.0	1.8	1.7
Highly Stimulative	1.0	1.7	2.1	2.4	2.2	2.2
Stimulative	1.0	1.6	1.9	2.3	2.1	2.0
Stimulative with Offset	1.0	1.4	1.7	2.0	1.7	1.6
Restraint	1.0	1.3	1.5	1.8	1.5	1.5
BALANCE OF PAYMENTS CURRENT ACCOUNT BALANCE (% OF GNE)						
86 Parity	-1.8	-1.8	-2.2	-2.1	-2.5	-2.7
Mortgage and Property Tax Credit	-1.9	-2.0	-2.5	-2.5	-2.9	-3.1
Highly Stimulative	-2.0	-2.6	-3.2	-3.3	-3.8	-4.0
Stimulative	-2.0	-2.4	-3.0	-3.1	-3.5	-3.7
Stimulative with Offset	-2.0	-2.0	-2.5	-2.4	-2.8	-2.9
Restraint	-2.3	-2.0	-2.3	-2.1	-2.4	-2.5
ENERGY BALANCE OF PAYMENTS (% OF GNE)						
86 Parity	1.0	0.9	0.4	0.1	-0.4	-0.7
Mortgage and Property Tax Credit	1.0	0.9	0.4	0.1	-0.4	-0.7
Highly Stimulative	1.0	0.9	0.4	0.1	-0.4	-0.6
Stimulative	1.0	0.9	0.4	0.1	-0.4	-0.7
Stimulative with Offset	1.0	0.9	0.4	0.1	-0.4	-0.7
Restraint	1.0	0.9	0.4	0.1	-0.4	-0.7
NON ENERGY BALANCE OF PAYMENTS (% OF GNE)						
86 Parity	-2.9	-2.8	-2.6	-2.2	-2.1	-2.0
Mortgage and Property Tax Credit	-2.9	-2.9	-2.9	-2.6	-2.5	-2.4
Highly Stimulative	-3.1	-3.5	-3.6	-3.4	-3.4	-3.4
Stimulative	-3.1	-3.3	-3.4	-3.1	-3.1	-3.1
Stimulative with Offset	-3.1	-2.9	-2.9	-2.5	-2.4	-2.3
Restraint	-3.3	-2.9	-2.7	-2.2	-2.0	-1.8

Source: CANDIDE Model 2.0.

Footnotes

1 The forecast for the United States is taken from the July 18, 1979 Post-Meeting Control Solution of the Wharton Annual and Industry Forecasting Model. This solution has been aligned with the June 28, 1979 Control Solution Update of the Wharton Quarterly Model for the 1978-81 period.

2 National Energy Board, Canadian Natural Gas, Supply and Requirements, February 1979.

3 National Energy Board, Canadian Oil, Supply and Requirements, September 1978.

4 An energy accounting system is used incorporating assumptions for prices, volumes and relationships relating to consumption, production, investment, trade and royalties for crude petroleum and natural gas. Where appropriate, details will be drawn from this system in order to clarify the discussion.

5 Energy, Mines and Resources Canada, Financing Energy Self-Reliance, Minister of Supply and Services Canada, 1977, page 10.

6 Imports from the United States which are related to the movement of "swaps" are excluded from the weighting scheme.

7 Old oil is classified as that arising from production of all oil less that from reserve additions, pentanes plus and oil sands.