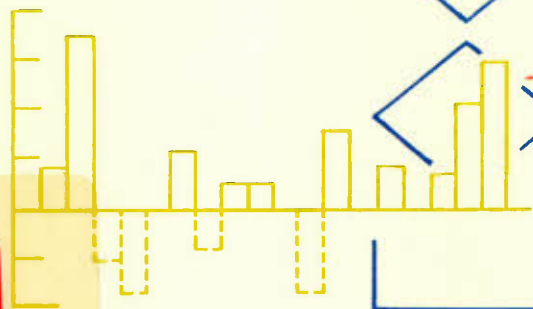




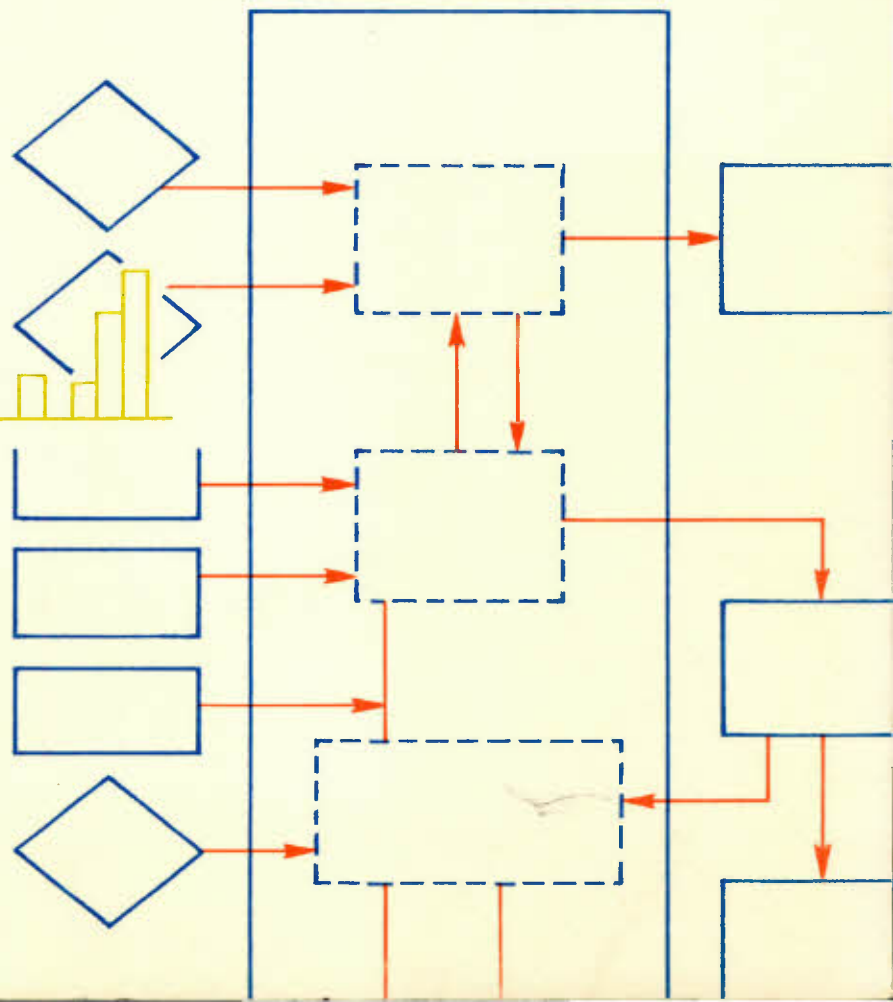
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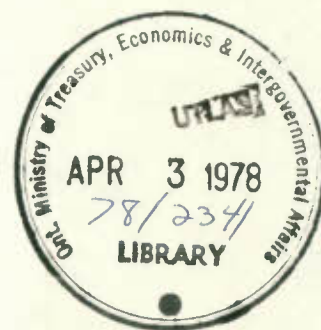


DISCUSSION PAPER NO. 77

Effects of Alternative Sources of
Inflationary Shocks on the Budgetary
Position of Governments: Some
Simulation Results with CANDIDE 1.2M

by Bimal Lodh

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January 1977



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RÉSUMÉ ET CONCLUSIONS

Ce document est consacré à une analyse, réalisée à l'aide du modèle CANDIDE 1.2M, de l'impact de divers chocs inflationnistes générés par une variété de sources intérieures et étrangères sur les positions budgétaires par niveaux de gouvernement, fédéral et non fédéraux, au Canada. Au moyen du modèle CANDIDE, diverses simulations sont effectuées pour la période 1974-1985, en appliquant différents types de chocs à quelques solutions de référence de CANDIDE. Les chocs sont : (a) une augmentation des salaires de 1 % dans 12 industries de CANDIDE pour 1976 seulement; (b) une augmentation des salaires de 5 % dans 12 industries de CANDIDE pour 1976 seulement; (c) une augmentation des salaires de 1 % dans 12 industries de CANDIDE pour la période 1976-1985; (d) une augmentation des taux d'impôts indirects de 10 % applicable aux dépenses de consommation et à la taxe provinciale de détail pour la période 1976-1985; (e) une dévaluation du taux de change canadien de 10 % de 1976 à 1985 et (f) un accroissement des prix d'un ensemble donné de produits d'exportation et d'importation pour la période de 1976 à 1985. Chacun de ces chocs a créé un scénario particulier de l'inflation ainsi qu'un ensemble de valeurs de variables endogènes comprenant non seulement les valeurs de variables macro-économiques essentielles, mais aussi celles des postes désagrégés des dépenses et des recettes publiques des deux paliers de gouvernement, fédéral et non fédéral. Aux termes d'un ensemble standardisé d'hypothèses concernant l'indexation des revenus et des paiements de transfert, les résultats des simulations pour tous les types de chocs sauf (d) indiquent un gain pour le gouvernement fédéral mais une perte pour le gouvernement non fédéral en ce qui concerne leurs soldes budgétaires respectifs. Dans le cas de (d), le gouvernement non fédéral améliore sa position budgétaire, alors que celle du gouvernement fédéral se détériore. La raison en est attribuable aux différentes réactions par palier de gouvernement, des diverses composantes endogènes des recettes et des dépenses publiques, lorsque l'économie est soumise aux divers scénarios de l'inflation que génère chaque type de choc.

Ce document tente ensuite d'identifier les principales composantes qui exercent une forte influence du côté des recettes et des dépenses, et par conséquent, sur les soldes budgétaires des deux niveaux de gouvernement. On y trouve également une tentative d'isoler les variations dans les indices de prix implicites et dans les niveaux d'activité (termes réels) des composantes qui ensemble en génèrent les valeurs nominales. Dans le cas de plusieurs composantes, particulièrement du côté des recettes où n'existent pas de variables réelles, on utilise des mesures d'élasticité pour étudier l'impact des variations de revenu par rapport aux variations dans un indice global comme celui de la D.N.B..

Enfin, le document se termine par une note sur les variables endogènes et exogènes (que le modèle ne pouvait traiter aux fins d'expériences de simulation) qui laisse l'impression que les résultats des simulations seraient douteux ou biaisés.

ABSTRACT AND CONCLUSIONS

This paper deals with an analysis of the impact of alternative inflationary shocks generated by a variety of sources, domestic and foreign, on the budgetary positions by levels of government, federal and nonfederal in Canada using CANDIDE 1.2M Model. Various simulations with the CANDIDE Model are performed for a period, 1974-85, by administering different types of shocks to some existing reference solutions of CANDIDE. The shocks are: (a) 1 per cent increase in wages across 12 CANDIDE industries in 1976 only; (b) 5 per cent increase in wages across 12 CANDIDE industries in 1976 only; (c) 1 per cent increase in wages across 12 CANDIDE industries from 1976 through 1985; (d) 10 per cent increase in indirect tax rates applicable to consumer expenditure items and provincial retail taxes from 1976 through 1985; (e) 10 per cent devaluation of the Canadian exchange rate from 1976 through 1985 and (f) increasing the prices of a given set of export and import items from 1976 through 1985. Each of these shocks created a particular inflationary scenario together with a set of values of endogenous variables which include not only the values of essential macro-variables but also those of disaggregated items of government expenditures and revenues by two levels of government, federal and nonfederal. Under a standard set of assumptions regarding indexation of incomes and transfer payments, the results of the simulations under all types of shocks except (d) suggest that the federal government gains but the non-federal government loses with respect to their respective budgetary balances. In the case of (d), the nonfederal government improves its budgetary position whereas for federal government it deteriorates. The reason for this, lies in the different responses of various endogenous government revenue and expenditure components by levels of government when the economy is subject to alternative inflationary scenarios as generated by types of shocks.

This paper then attempts to identify the major components which affect strongly the revenue and expenditure sides, and, therefore, the budget balances of the two levels of government. Efforts are made also to isolate changes in the price deflators and in activity levels (real terms) of the components that in combination generate the nominal values of the components. For many components, particularly on the revenue side, where real variables do not exist, elasticity measures are used to study the impact of revenue changes with respect to changes in an over-all deflator like GNE deflator.

Finally the paper ends with a note on those endogenous and exogenous (which the model could not handle for simulation experiments) variables that may leave the results of the simulations suspect or biased.

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INTRODUCTION

This paper examines the impact of alternative sources of inflation on the budgetary position of federal and nonfederal governments in Canada, using CANDIDE 1.2M Model. Conventional wisdom¹ tells us that the main gainer from recent inflation is government when there is the absence of (a) complete and contemporaneous indexation of various types of taxable incomes, and (b) other counter-inflationary discretionary or automatic measures by governments. This paper intends to show that under various types of inflationary scenarios the budgetary positions vary by levels of government, i.e., whether the government is federal or nonfederal.² Various simulations with the CANDIDE Model are performed under a standard set of assumptions regarding indexation of incomes and transfers. Results show that under all types of inflationary scenarios examined except for inflation induced by an increase in indirect tax rates, federal

1 See Back and Stephenson (1974). The usual arguments supporting this wisdom primarily are: (a) inflation reduces the real value of government interest bearing debt; (b) inflation introduces a progressivity of tax burden on income, capital gains and business profits; and (c) the issue of money by the central government during periods of inflation is a source of revenue to that government. See Laidler and Parking (1975).

2 Nonfederal government in this paper includes both provincial and local governments. CANDIDE does not distinguish between the two levels of government explicitly although such a distinction may widen the scope of the study.

government gains whereas nonfederal government tends to lose with respect to their respective budgetary positions. The reason for this is that different inflationary shocks influence various government revenue and expenditure components by levels of government in different ways. To demonstrate this, different types of shocks are first administered to various reference solutions of CANDIDE 1.2M Model during the period, 1976-85. These experiments generate alternative inflationary scenarios in the economy, whereupon deviations of the shocked solutions from their respective reference solutions are studied at the disaggregated levels of government revenues and expenditures. These deviations (or responses)³ which are in nominal values are then decomposed, wherever feasible, in terms of appropriate prices or price deflators and activity levels (in real terms). The latter helps to identify the inflationary impact on the real and price counterparts of major nominal values of components constituting the budget balances of governments.

3 This applies only to the endogenous government revenues and expenditures. There are, however, some exogenous revenue and expenditure components which were not modelled. Their responses in terms of deviations from the reference solution values would amount to zero. However, an attempt is made later in this paper to estimate the magnitude of these exogenous components. To the extent this magnitude is large relative to the endogenous components, the inflationary effects on budgetary positions will be biased.

This paper is organized in four sections: Section 1 deals with some essential features of the government sector in CANDIDE and with the way simulation experiments are performed; Section 2 presents the results showing the net effects of inflation on the budgetary situations of governments (federal, nonfederal and total); Section 3 attempts to identify the inflationary impact on the real and price counterparts of major nominal values of revenue and expenditure components; and Section 4 records the limitations of the simulations and offers suggestions for improvement of CANDIDE.

I. Simulations of the Government Sector with CANDIDE 1.2M Under Alternative Inflationary Scenarios

1.1 Some General Features of the Government Sector of CANDIDE in the Present Study

The data base of variables pertaining to the govern-
ment sector⁴ of CANDIDE covers the period 1955-73 and is derived from the National Accounts. It is primarily geared to two levels of government, federal and nonfederal. Nonfederal government includes both the provincial and local governments and hence an analysis of nonfederal government budgets may suffer from an aggregation bias in CANDIDE model insofar as the local government budget is not adequately⁵ and separately formalized in the model. Thus, simulation experiments with CANDIDE need to be confined only to federal, nonfederal and total government levels.

The major revenue and expenditure components of the two levels of government are provided in Appendix A (exogenous variables are starred). Variables representing these components are all in nominal terms and sometimes on the expenditure side we have variables for which we have both real and price counterparts.

4 Government sector variables of CANDIDE 1.2M are spread out in Blocks 6, 19, 24, 35, 36, 38 and 46. Interested readers are invited to CANDIDE 1.2M documentation.

5 There are some local government variables in CANDIDE like property taxes, local government wages and salaries, local school wages and salaries, etc., but these do not exhaust the budgetary picture of local governments.

As mentioned earlier, some appropriate price indices are necessary to deflate the nominal values of all major components on the revenue and the expenditure side to approximate some real values of those components. This enables one to examine the impact of inflation on the real and price counterparts of each component. In CANDIDE for certain expenditure items we have some own-price deflators whereas for others one may have to choose an over-all deflator like the implicit GNE deflator. For revenue components, however, it is difficult to conceptualize different price deflators that are applicable to arrive at revenue estimates in real terms.⁶

Revenues are collected by direct and indirect taxes and transfers (or subsidies), and are pooled in one bag to meet various government expenditures. How should one disentangle one source of revenue from another so as to come out with different deflators? As the conceptual problems here abound, it may not be entirely out of place to use a single deflator like implicit GNE deflator for all revenues from goods and services, and perhaps CPI for transfer payment items if some real dimensions of revenue components are

6 The only price (or prices) that is relevant to revenue collection is the political price that the government (or levels of government) has to pay to make increased taxes feasible. However, the incidence of taxes on consumers or producers without due regard to the political price of government stability may be an inappropriate indicator of government revenue deflator. So far in the literature on the subject there is hardly any consistent quantitative price indicator to act as an approximation to government revenue deflator, least of all a galaxy of deflators for the multitude of revenue components. See Harberger (1964).

to be assessed. In this paper we use the implicit GNE deflator for all purposes of evaluating real or activity variables unless some explicit deflators are readily available and are meaningful.

1.2 Simulation Experiments of CANDIDE for the Study of Government Sector Responses under Inflationary Shocks

The methodology adopted in the simulation experiments of CANDIDE 1.2M follows the traditional approach of shocking an econometric model by exogenous disturbances and then pursuing the responses of endogenous variables of the shocked solution with respect to their given reference solution values over a particular period. Shocks could be administered at a point of time or over time. The procedure followed in our experiments can be described as follows:

- (a) We have chosen three alternative reference solutions (called Reference Solution 1, 2 and 3) for the projection period, 1974-85. Each solution provides a particular scenario of the Canadian economy and each embodies a particular set of assumptions regarding the nature of certain exogenous variables. However, all reference solutions have some common set of exogenous variables and differences between solutions can be interpreted as differences in the initial conditions brought about by only divergent exogenous assumptions between solutions. The choice of divergent reference solutions has also been dictated by the

the desire to test whether initial conditions do matter substantially when similar shocks are administered. The reference solutions are characterized by the following features.

(i) Reference Solution 1 assumes

- (1) personal income tax rates are decreased from 6 to 5 per cent for the first income bracket and from 18 to 15 per cent for the second income bracket from 1976 through 1980, and raised to 6 per cent and 18 per cent respectively from 1981 to 1985;
- (2) the high-powered money supply is endogenous and is dependent on nominal GNP, viz, the rate of growth money-supply is 90 per cent of the rate of growth of nominal GNP;
- (3) the exchange rate is fixed and change in foreign reserves are sterilized;
- (4) the U.S. economy is characterized by slow growth, moderate unemployment and high interest rates;
- (5) increasing exports to OPEC countries and the energy scenario is characterized by moderate price increases.

(ii) Reference Solution 2 has also the above assumptions except assumption (1) whereby personal income tax rates are kept at 6 per cent and 18 per cent throughout the whole period, 1974-85.

- (iii) Reference Solution 3 is the same as Reference Solution 2 except for the assumptions (4) whereby the U.S. economy is assumed to be characterized by moderate growth, lower unemployment and high interest rates.

All reference solution values are dubbed as 'A' in this paper.

- (b) The types of shocks which are administered to various reference solutions are illustrated in the following Table X.

Table X

Simulation Experiments of Alternative Inflationary Scenarios by Divergent Shocks to Various Reference Solutions of CANDIDE 1.2M

Types of Shocks	Type of Reference Solution		
	Reference Solution 1	Reference Solution 2	Reference Solution 3
1. 1% wage shock in 1976 only	x(1,1)	x(1,2)	-
2. 5% wage shock in 1976 only	x(2,1)	x(2,2)	-
3. 1% wage shock from 1976-85	x(3,1)	x(3,2)	-
4. 10% increase in indirect tax rates 1976-85	-	x(4,2)	-
5. 10% devaluation of exchange rate 1976-85	-	-	x(5,3)
6. Increase in prices of selected export and import items, 1976-85	-	x(6,2)	-

Note: Blank spaces denote that no simulations are performed. All wage-shocks refer to additional wages across 12 CANDIDE industries as of their reference solution values in 1976 and/or 1976 through 1985, depending on whether the shock is for one period or sustained throughout the projection period. Twelve CANDIDE industries are: agriculture, forestry, fishing, mining, manufacturing, construction, transportation, utilities, trade, finance, services and public administration.

In total, nine simulations are first performed of which wage-shock experiments constitute the majority. The variety of wage-shock experiments has been undertaken to examine as to whether differences in types of reference solution and/or durations of shock affect the various endogenous government expenditures and revenues drastically, not only in the sense of direction but also in speed or intensity.

- (c) Finally, for each shock experiment two additional steps have been alternatively arranged. In the first step all real or activity variables of any chosen reference solution are frozen⁷ (exogenized) and the model is solved for the entire period, 1976-85 under the shock. This yields what we shall call Solution 'B' for all nominal variables. In the next step the assumption of exogenous real variables is withdrawn and the model is solved similarly under the shock. This yields new solution called Solution 'C'.

Before one goes to isolate some particular effects from these simulations, two major assumptions embedded in CANDIDE 1.2M must be mentioned in this connection while running

⁷ The real or activity blocks of CANDIDE 1.2M are 1-12, 23, 25, 32 and 39 which involve all real expenditure items on the final demand side and all real outputs on the production side.

these simulations. First, the model assumes a given set of indexation procedures applicable to incomes and transfers, mainly indexed by CPI in some form of distributed lags.⁸ Secondly, the money supply (high-powered money) growth rate is related to the growth rate of nominal GNP. While it is true that indexation affects the budget balances of government we have avoided the task of formulating alternative indexation schemes and studying its separate effects as it is a subject-matter of another study recently completed.⁹ It is believed that under a standard set of assumptions regarding indexation of taxable incomes and transfer payments which is applied to all simulations, the comparisons between simulations can be safely made without any bias of indexation, i.e., Solutions A, B and C could be compared among themselves in the context of each reference solution (1 or 2) without any bias of indexation. As for the endogenous money supply assumption, Solution B, where real variables are exogenized, offers only relative price changes with the relative real dimensions remaining unchanged. Therefore, money supply may be serving here a neutral role insofar as real magnitudes are unchanged in Solution B. This neutrality disappears when real

8 In none of these forms is there any use of contemporaneous CPI.

9 See Carlton Braithwaite: "The Effects of Indexing on the Built-In Stability of the Canadian Economy", Discussion Paper No. 65, Economic Council of Canada, October 1976.

variables are assumed to be endogenous as in Solution C since the composition of real variables changes. Elsewhere it is shown¹⁰ that in the context of CANDIDE 1.2M when the endogenous money supply assumption is replaced by an exogenous money supply at a reduced level, real variables do appear to be diminished from the levels of Solution C -- a feature which corresponds to the Keynesian IS-LM framework.

Simulations described above are intended to highlight the following effects:

- (i) With respect to each reference solution (1 or 2) the difference between Solution B and A captures the price or inflationary effects for the various nominal variables and that between C and A captures the combined effects of price and activity. However, the difference between C and B captures not only the activity effect but also the interaction of price and activity effects.
- (ii) For each reference solution, a comparison can be made between Solution 'B' (or 'C') under 1 per cent wage shock and Solution 'B' (or 'C') under 5 per cent wage shock. This brings out the impact of the difference in the magnitudes of similar type of shocks on the various aspects of government budget balances. Also comparisons between other solutions can be similarly made to isolate special effects.

10 See Lodh, B., Notes on the Compositional Effects of Government Expenditure and Revenue Simulations: Some Results of CANDIDE 1.2M, Memorandum, December 1976.

II. Results of Over-all Effects on the Budgetary Balances of Government

The results of budgetary positions of different levels of government, federal, nonfederal and total, in the context of our experiments are summarized in Table A. The latter is a condensed version of Tables 1 to 7, and 1* to 7* listed in the appendix where deviations of the shocked solutions from respective reference solutions are shown in absolute terms. These tables represent the following particular features of the simulations.

- (a) But for the inflationary scenario generated by a shock of increased indirect tax rates (Shock 5), all the other scenarios demonstrate a favourable impact on the budgetary position of federal government whereas for the nonfederal government the situation deteriorates systematically. The rationale for this, as will be explained later on, lies in an increasing revenue earnings from indirect taxes by the nonfederal (provincial) governments despite a fall in real GNE and a rise in GNE deflator. Since the total government budget is the arithmetic sum of the two levels of government, the total government budgetary position moves accordingly.

Table A

A Display of Tables Showing the Impact on the Budgetary Positions of Governments and Other Macro-Variables from Alternative Sources of Inflationary Shocks to Various Reference Forecast Solutions of CANDIDE 1.2M over 1976-85

(Symbols used: (+) for better-off after the shock, (-) for worse-off after the shock, when activity variables are endogenous)

Nature of Shock	Type of Reference Solution	Source and Table No.	Federal Budget	Nonfederal Budget	Total Government Budget	GNE (Real terms)	GNE Deflator	Unemployment Rate	Current Account Balance of Payments
1. 1% wage-shock in 1976 only	1	Table 1	(-) 1976 (+) 1977-85	(-)	(-) 1976-80 (+) 1981-85	(-) 1976-79 (+) 1980-85	(-)	(-) 1976-82 (+) 1983-85	(-)
2. 5% wage-shock in 1976 only	1	Table 2	(-) 1976 (+) 1977-85	(-)	(-) 1976-80 (+) 1981-85	(-) 1976 (+) 1977-85	(-)	(-) 1976-79 (+) 1980-85	(-)
3. 1% wage-shock in 1976 only	2	Table 3	(+)	(-)	(-) 1976-79 (+) 1980-85	(-) 1976-80 (+) 1981-85	(-)	(-) 1976-82 (+) 1983-85	(+) 1976-78 (-) 1979-85
4. 1% wage-shock from 1976-85	2	Table 4	(+)	(-)	(-) 1976-82 (+) 1983-85	(-) 1976-79 (+) 1980-85	(-)	(-) 1976-82 (+) 1983-85	(+) 1976 (-) 1977-85
5. 10% increase in indirect tax rates from 1976-85	2	Table 5	(-)	(+)	(+)	(-)	(-)	(-)	(+)
6. 10% devaluation of Canadian exchange rate from 1976-85	3	Table 6	(+)	(+) (-) 1976-82 (-) 1983-85	(+)	(+)	(-)	(+)	(+)
7. Selected price increases in certain export and import items, 1976-85	1	Table 7	(+)	(+) (-) 1976-78 (-) 1979-85 and 1979-82 (-) in other years	(+) (+) 1976-77 (-) in other years	(-)	(-)	(-)	(+) 1976-79 1982-83 (-) in other years

Note: Signs (+) and (-) above correspond to C-A values in each of the above tables. Solution 'C' refers to the shocked solution when all activity variables are endogenous and 'A' refers to the respective reference solution. Experiments other than those reported here like 1% wage shock from 1976-85 applied to reference solution 1, 5% wage shock sustained from 1976 through 1985 and so on are not reported here to save space. Broadly speaking, these simulations repeat those shown in experiments 3 and 4 above except for exact dating of better-off or worse-off situations for GNE, unemployment rate and total government budget. Tables 1 to 7 are shown at the end of the text and these bring out the absolute changes from respective reference solution values. B-A values for the above simulations are also shown at the end of the text in Tables 1* to 7* where B refers to the solution when activity or real variables are frozen at the reference solution values. Tables 1 to 7 and 1* to 7* do not show the current account balance of payments in absolute terms. However, they may be obtained on request.

(b) Reference Solutions 1, 2 and 3 with their characteristic 'A' values denote different levels of activities and prices (see Table 1, 3 and 6, Columns (11), (13) and (15)), over the period 1976-85. It may be reiterated that these differences in 'A' values stem from different exogenous assumptions regarding external (moderate U.S. GNP growth rate in reference solution 3 vis-a-vis mild growth rate in other solutions) and internal (a lower personal tax rate in reference solution 1 vis-a-vis other solutions) environments. Thus one obtains a higher GNE, a higher GNE deflator and a lower unemployment rate in reference solution 1 than in reference solution 2 (Table 1 and Table 3) solely because of lower personal income tax rates. Also as expected, the total government budget is worse in reference solution 1 than in reference solution 2 because of tax cuts. In this context an interesting question that was posed earlier is to examine how similar shocks can impact different reference solutions differently. To this, the results of the simulations particularly with respect to wage-shocks demonstrate that the choice of reference solutions may not be that important as the budgetary situations of government, federal and nonfederal, after similar shocks, show that the "stance of fiscal balance" is in the same direction of surplus or deficit irrespective of the reference solutions

(see Table B). Note also that under all types of wage-shocks the budgetary position of nonfederal government never improves whereas that of federal government improves consistently. However, the magnitude of shocks (5 per cent shock versus 1 per cent wage shock) changes the rankings of solutions A, B and C particularly in favour of federal government, i.e., $C > B > A$, as more GNE (real) and price pressures (GNE deflator) are created (see Table B and Tables 1, 1*, 2 and 2*).

Table B

Comparative Results of Government Budgetary Situation, Total Government, Federal and Nonfederal, Under a Given Wage-Shock Applied to Different Reference Forecast Solutions of CANDIDE 1.2M, 1976-85

(1 per cent wage shock in 1976 only)

Year	Total Government Budget Balance		Federal Government Budget Balance		Nonfederal Budget Balance	
	Reference Solution 1	Reference Solution 2	Reference Solution 1	Reference Solution 2	Reference Solution 1	Reference Solution 2
1976	A > B > C	B > A > C	B > A > C	B > C > A	A > C > B	A > B > C
1977	B > A > C	"	B > C > A	"	A > B > C	A > B > C
1978	"	"	"	"	"	"
1979	B > A > C	B > A > C	"	"	"	"
1980	"	B > C > A	"	"	"	"
1981	B > C > A	"	"	"	"	"
1982	"	"	"	"	"	"
1983	"	"	"	"	"	"
1984	"	"	"	"	"	"
1985	"	"	"	"	"	"

(5 per cent wage shock in 1976 only to Reference Solution 1)

1976	A > B > C	B > A > C	A > B > C
1977	"	B > C > A	A > B > C
1978	"	"	"
1979	"	"	"
1980	A > C > B	C > B > A	"
1981	C > B > A	"	"
1982	"	"	"
1983	"	"	"
1984	B > C > A	"	"
1985	"	"	"

Note: Reference Solution 1 and Solution 2 are explained in the text. The notation B > C > A, for example, implies that for the given level of government, the budgetary position in Simulation B is better than in Simulation C and that in Simulation C is better than in Simulation A. Simulations A, B and C are explained in the text.

Source: Table 1, 1*, 2, 2*, 3 and 3*.

- (c) A sustained wage shock results in higher GNE (real), higher GNE deflator and lower unemployment rate than a single period wage shock (Tables 3 and 4). These effects reinforce the budgetary position of federal government favourably and that of nonfederal government unfavourably.
- (d) The alternative profiles of GNE deflator -- unemployment rate -- real GNE with respect to various inflationary scenarios suggest that whenever GNE deflator and real GNE increase, a fall in unemployment rate follows only with a lag. This lag is smaller, the larger the rate of increase of real GNE (see Tables 1 and 2) and vice-versa. However, an inflationary scenario can also be created with worsening unemployment and real GNE (Shock 5, Table 5). The implications of all this in the context of budgetary position of governments boil down to the contention that an increase in either real activity or inflation contributes to a favourable budgetary position of total government whereas a decrease in either of them worsens the situation. However, real effects and inflationary effects have differential impacts at the two levels of government, federal, nonfederal.

Thus to isolate the effects of inflation alone, simulations characterized as 'B' where all real variables are exogenized show how much pure inflationary effects bear on the various endogenous variables as compared to the reference solution values characterized as 'A'. For example, Table 5* under a shock of increased indirect tax rates indicates that by 1985 when GNE deflator increases by .028 index points (with real effects exogenized) the budgetary positions of both levels of government improve but their relative gains are different, i.e., nonfederal government fares better than federal government in absolute terms. The latter situation is aggravated as real effects are endogenized in Table 5 where with a fall in real GNE federal government loses considerably while non-federal government gains. This brings out the interactions of both real and inflationary effects. A similar interpretation can be given for other simulations.

The above represents a brief summary of the overall effects of inflationary pressures on the budget balances of various levels of government. In what follows some attempts are made to decompose various items of revenues and expenditures that sum up the budget balances by levels of government under alternative inflationary scenarios.

III. Decomposition of Expenditure and Revenue Components by Levels of Government in Alternative Simulations

The effects of alternative sources of inflation on the various components of federal and nonfederal expenditures and revenues that sum up their respective budgetary positions are examined in the following manner. In the first instance only the major¹¹ components of nominal endogenous expenditures and revenues as determined by their dominant shares in the reference solutions for the two levels of government are chosen for evaluation. Secondly, each scenario (both solutions B and C) under a given shock to a particular reference solution is examined in terms of its nominal absolute and percentage deviations from the respective reference solution. These percentage deviations of components are then transformed into elasticities by dividing by percentage change in the GNE deflator in each shocked solution in order to obtain comparable component elasticities in alternative simulations. The results derived from this procedure are presented in Table C which shows the elasticities of components for the terminal year 1985 under a variety of shocks discussed earlier. Partial effects are

11 The detailed items are listed in Appendix A. A completely disaggregated analysis is avoided for the sake of brevity.

characterized by Solution B and full effects are characterized by Solution C. Table C offers the following findings.

1. Elasticities greater than unity (less than unity) suggest that the percentage changes in nominal dollars of components increase faster (slower) than the percentage change in GNE deflator, the overall measure of inflationary pressure used for this study. Negative elasticities represent the perverse effects of inflation when nominal values of components fall with rising inflation -- a result which is predominantly discernible in the case of indirect tax rates increase (Shock 5) where real GNE falls¹² with inflation. The latter erodes mainly the tax base for direct tax revenues but boosts indirect tax revenues considerably which go predominantly into the nonfederal treasury.

12. This perversity is avoided as soon as activity variables (including real GNE) are exogenized in the same shock. The latter is shown under partial effects (Solution B). This shows that the apparent perversity is largely due to a fall in real activity (particularly real GNE) which is what is both a cause and an effect of fall in other economic activities including certain government expenditure components.

Table C

Long-Run Elasticities of Major Endogenous Components of Expenditures and Revenues of Government, Federal and Nonfederal under Alternative Inflationary Scenarios Generated by Divergent Shocks, Domestic and Foreign, to Various Reference Forecast Solutions of CANDIDE 1.2M, 1976-85

(Elasticities shown here are for the terminal year, 1985 with respect to the GNE deflator)

Types of Shocks	1% wage-shock to Ref. Sol. 1 (shock 1; 1976 only)		5% wage-shock to Ref. Sol. 1 (Shock 2; 1976 only)		1% wage-shock to Ref. Sol. 2 (Shock 3; 1976 only)		1% wage-shock to Ref. Sol. 2 (Shock 4; 1976-85)		10% increase in indirect tax rates (Shock 5; 1976-85)		10% devaluation of exchange rate (Shock 6; 1976-85)		Price shock to certain export & import items (Shock 7; 1976-85)	
	Partial Effects	Full Effects	Partial Effects	Full Effects	Partial Effects	Full Effects	Partial Effects	Full Effects	Partial Effects	Full Effects	Partial Effects	Full Effects	Partial Effects	Full Effects
<u>Federal Government</u>														
<u>Expenditures</u>														
1. Defence	1.03	1.02	1.08	1.06	1.05	1.03	1.17	1.15	.60	-.50	.73	.98	.87	.91
2. Hospital depreciation	.88	.91	.96	.98	.88	.91	.97	1.00	.71	-.03	1.31	1.17	.92	1.01
3. Federal wages and salaries	1.38	1.23	1.45	1.22	1.42	1.27	1.60	1.40	.77	.46	.42	.72	1.06	1.05
4. Other expenditures	.93	.98	1.03	1.02	.92	.98	1.04	1.09	.60	.98	1.17	.98	1.14	1.29
5. Total goods and services	1.16	1.10	1.23	1.12	1.18	1.12	1.32	1.24	.68	.32	.73	.88	1.02	1.07
6. Residential construction	1.13	1.17	1.35	1.29	1.12	1.17	1.35	1.37	1.00	1.19	1.04	1.16	1.23	1.37
7. Federal buildings	1.12	1.15	1.32	1.27	1.11	1.16	1.33	1.35	1.03	1.26	1.07	1.18	1.19	1.36
8. Highways	1.04	1.08	1.25	1.20	1.03	1.07	1.25	1.27	1.04	.71	1.23	1.18	1.37	1.47
9. Other engineering	.91	.98	1.06	1.14	.91	.99	1.08	1.18	.80	-.69	.78	1.04	.98	1.06
10. Machinery and equipment	.76	.81	.68	.85	.77	.83	.67	.84	.38	-2.71	2.00	1.48	.57	.48
11. Total gross fixed capital	.94	.99	1.04	1.10	.94	1.00	1.05	1.13	.76	-.51	1.29	1.23	1.20	1.37
12. Transfers to persons	.82	.83	.79	.59	.83	.83	.78	.66	.65	5.50	.64	.33	.86	1.25
13. Transfers to governments	.86	1.03	.92	1.17	.85	1.04	.99	1.19	.55	-1.78	.38	.93	.73	.80
<u>Revenues</u>														
1. Personal income tax	1.69	1.90	1.76	1.65	1.70	1.50	1.89	1.78	.72	-3.82	.65	1.30	1.27	.82
2. Unemployment insurance	1.25	1.41	1.31	1.18	1.27	1.50	1.27	1.45	.74	9.93	.52	-.67	1.00	1.67
3. Corporate and business tax	-.06	.22	.23	.18	-.07	.21	.26	.11	.35	-2.17	2.11	.82	-.49	.19
4. Indirect taxes	.71	.76	.55	.78	.73	.78	.54	.80	1.10	-.95	1.93	1.26	.89	.90
5. Other investment income	.96	1.05	.94	1.12	.94	1.04	.90	1.07	.92	-.97	2.06	1.72	6.63	1.62
6. Total revenue	1.15	1.12	1.13	1.18	1.14	1.13	1.17	1.24	.65	-1.36	1.20	1.06	1.46	.89
<u>Nonfederal Government</u>														
<u>Expenditures</u>														
1. Capital consumption allowances	.88	.95	.97	1.02	.88	.95	.97	1.03	.71	.10	1.31	1.14	.92	1.03
2. Provincial wages and salaries	1.24	1.25	1.28	1.34	1.28	1.29	1.42	1.49	.60	-2.21	.11	.93	.82	.83
3. Municipal wages and salaries	1.22	1.23	1.28	1.27	1.24	1.26	1.40	1.43	.67	-2.29	.38	.98	.94	.80
4. School wages and salaries	.63	.70	.78	.93	.63	.71	.95	1.04	.19	-2.95	-.43	.66	.22	.42
5. Hospital wages and salaries	.68	1.12	.85	1.46	.68	1.14	1.03	1.48	.21	-5.76	-.46	.84	.24	.41
6. Others	.93	1.02	1.03	1.19	.92	1.03	1.04	1.21	.60	-2.16	1.17	1.28	1.14	1.10
7. Provincial medicare	.89	1.07	1.08	1.45	.89	1.08	1.25	1.64	.51	-4.75	.21	1.07	.64	.71
8. Total goods and services	.92	1.08	1.03	1.20	.93	1.09	1.16	1.36	.47	-3.17	.20	.97	.66	.72
9. School construction	1.16	1.15	1.32	1.27	1.12	1.16	1.33	1.35	1.03	1.26	1.07	1.18	1.19	1.36
10. Highways	1.04	1.15	1.25	1.32	1.03	1.14	1.25	1.37	1.04	.71	1.23	1.02	1.37	1.57
11. Other engineering	.91	.98	1.06	1.06	.91	.99	1.08	1.16	.80	1.41	.78	.82	.90	1.23
12. Machinery and equipment	.76	.79	.68	.82	.77	.81	.67	.80	.38	-2.34	2.00	1.46	.57	1.41
13. Total fixed capital formation	1.02	1.10	1.19	1.24	1.01	1.10	1.20	1.31	.95	.52	1.16	1.01	1.20	1.37
14. Transfers to persons	.81	.87	.86	.98	.81	.87	.89	.99	.72	-.79	.70	.97	.85	.82
<u>Revenues</u>														
1. Personal income tax	1.69	1.50	1.76	1.65	1.70	1.50	1.89	1.78	.72	-3.82	.64	1.28	1.27	.82
2. Corporate and business tax	-.06	.22	.23	.18	-.07	.21	.26	.11	-.33	-2.05	1.99	.77	-.46	.19
3. Indirect taxes	.76	.83	.67	.87	.78	.85	.67	.90	6.99	14.61	.88	.87	.67	.71
4. Government investment income	.66	.71	.60	.74	.64	.69	.68	.77	.52	-1.32	.69	.82	1.02	1.62
5. Federal transfers	.86	1.03	.92	1.17	.85	1.04	.99	1.19	.55	-1.78	.38	.93	.73	.80
6. Total revenue	.85	.90	.84	.98	.84	.89	.88	1.01	2.28	2.52	.66	.88	1.66	.74
Percentage change in GNE deflator	3.45	3.94	3.82	11.38	3.99	4.54	13.33	14.83	.64	.24	2.74	6.43	1.21	1.51
Percentage change in Real GNE	--	.23	--	1.50	--	.30	--	2.00	--	-.14	--	.64	--	-.18

Source and Note: See Table A and various tables in the appendix. Partial effects are characterized by elasticities in Solution B where activity or real variables are exogenized i.e., frozen at the reference solution values and full effects are characterized by those in Solution C where activity variables are solved endogenously. Elasticity of any variable is calculated as a ratio of percentage change in the variable to the percentage change in the GNE deflator in the same solution, where percentage change is measured against the corresponding reference solution. Only for terminal year 1985, elasticities are shown in this table. For other years, elasticity measures are available on request. These are not reported here to save space. An example of elasticities of some variables over time is shown in Table 8.

2. Elasticities under partial effects symbolize the relative speed with which the deflators of the components (particularly expenditure components) move in conjunction with the GNE deflator as all real variables (including expenditures) are frozen at the reference solution values. Since revenue components are always in nominal terms, they cannot be exogenized in real terms and so the interpretation that can be attached to elasticities under partial effects for revenue items is only limited to a ratio of rate of change of nominal revenues to that of GNE deflator. Keeping this distinction in mind one observes that expenditure deflators under partial effects generally move relatively faster in Shock 2 than in Shock 1 (5 per cent wage shock vis-a-vis 1 per cent wage shock) for both levels of government after taking account of percentage change in GNE deflator. This brings out the impact of differential magnitude of single period shock on deflators of expenditure components. For revenue items, personal income tax elasticity becomes higher under an increased shock whereas total revenue elasticity remains relatively unchanged. However, total revenue elasticity remains always greater than unity for federal government in these shocks whereas for nonfederal government it is always less than one. This situation does not change even when activity variables are treated endogenously (full effects) except in Shock 4 when nonfederal

government total revenue elasticity just manages to live up to inflation rate whereas federal government total revenue elasticity shoots up to 1.24.

3. On the expenditure side, dominant elasticities in all wage shock experiments for federal government appear to be:

- (a) wages and salaries,
- (b) federal buildings and
- (c) highways.

For nonfederal government dominant elasticities are:

- (a) provincial wages and salaries,
- (b) municipal wages and salaries,
- (c) school construction,
- (d) highways,
- (e) hospital wages and salaries and
- (f) provincial medicare

For both levels of government these components bear a heavy weight in their total expenditures and, therefore, a combined effect¹³ of larger weights

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- 13 This can be shown by a simple decomposition formula where large weight multiplied by large elasticity has a significant combined effect on total expenditures or revenues.

Let $X_t = \sum X_{it}$ = total expenditures or revenues
 (= sum of individual components, i)
 at time t for shocked solution.

$X_t^* = \sum X_{it}^*$ = same as above but for the reference solution.

and $X_{it}^* = \alpha_{it} X_t^*$

then $\Delta X_t / X_t^* = \sum \alpha_{it} \Delta X_{it} / X_{it}^*$ (1)

where $\Delta X_t = X_t - X_t^*$, $\Delta X_{it} = X_{it} - X_{it}^*$.

Thus the percentage change in total expenditures or revenues is the weighted sum of percentage changes in the individual components at each time period, t. Dividing (1) by $\Delta P_t / P_t^*$ (percentage change in GNE deflator) we get:

$$l_t = \sum \alpha_{it} l_{it} \quad (2)$$

where $l_{it} = (\Delta X_{it} / X_{it}^*) / (\Delta P_t / P_t^*)$

$$l_t = (\Delta X_t / X_t^*) (\Delta P_t / P_t^*)$$

Total expenditure or revenue elasticity is thus a weighted sum of component elasticities where both weights and elasticities are changing with respect to time. Call $\alpha_{it} l_{it} = Z_{it}$ and then enumerate Z_{it} 's in order of highest to lowest values to see components' respective contributions at each time unit, t. Table C records the elasticities only for the terminal time period, 1985 where total revenue elasticity is not the weighted sum of the indicated components since only the major components are mentioned there, to the exclusion of other minor revenue items that also contribute to total revenues.

and elasticities greater than unity keep aggregate expenditures by levels of government rising continuously. However, with respect to experiments like Shock 6 and Shock 7 it is interesting to note how dominant elasticities in expenditures change their membership structure both for federal and nonfederal governments. In this respect the components in total fixed capital formation for both levels of government are worth mentioning although the impact is much more on non-federal government because of larger weights.

4. On the revenue side, dominant elasticities stay clearly for personal income tax for both federal and nonfederal governments except under Shock 5 where as stated previously some perverse reactions appear due to a fall in real GNE. However, since the personal income tax revenues (in reference solutions) are larger in federal than in nonfederal government, the equal elasticities of personal income tax component make room for larger absolute increments in revenues for federal government than for nonfederal government. Also, inflation just helps to keep federal transfers to nonfederal governments in line except for Shocks 5, 6 and 7. Nonfederal governments compare favourably in the area of indirect taxes relative to federal government, but revenues from this source never catch

up with inflation as elasticities are less than unity. Also on the revenue side federal government earns a healthy pay-off from unemployment insurance benefits, but for corporate and business tax revenues the pay-off is always low (almost negligible) for both levels of government.

5. A comparison of a sustained vis-a-vis a single period shock (Shocks 3 and 4) shows that almost all elasticities are higher in a sustained shock (both for partial and full effects) than in a single period shock. This is quite in agreement with what may be expected. Also it is interesting to note how pure inflationary effects (partial effects) have affected which components drastically. Noteable candidates here again are: (a) federal wages and salaries; (b) federal buildings; (c) federal income tax; (d) provincial wages; (e) municipal wages; (f) school wages; (g) provincial medicare; (h) school construction; (i) nonfederal personal income tax and (j) corporate and business tax for both levels of government.

To sum up, the decomposition exercise by components of expenditures and revenues at the two levels of government, federal and nonfederal under partial effects (Solution B) and and full effects (Solution C) offer interesting insights into the underlying interplay of effects of inflation and real variables. Although Table C presents the elasticities only for the terminal year 1985, an examination of elasticities over time under various shocks shows that with few exceptions elasticities tend to rise or decline monotonically. For the sake of brevity tables showing all these are not presented in this paper. An example of elasticities of some variables over time (Shock 1) is shown in Table 8.

CANDIDE provides perhaps one of the largest number of endogenous government expenditure and revenue equation in the existing multi-sector models. Correspondingly like other government expenditure and revenues equations in multi-sector models, it also has its own limitations with regard to the specifications of these equations. This is more so because at large disaggregated levels, the autonomous or discretionary elements in the decisions regarding expenditures or revenues seem to be very much dictated by the political exigencies of the time and much less by clear economic processes which make specifications relatively unstable. Without going into the details of specifications, suffice it to say that elasticities are as much subject to errors in specifications as to the way the model is built and solved.

IV. Scope of CANDIDE: Some Further Reflections

As mentioned earlier, CANDIDE 1.2M has not as yet full endogenized all government revenue and expenditure items. There are still some components which are exogenous¹⁴ in the model and are, therefore, not amenable to simulation experiments for studying responses under shocks. Some estimates of the degree of exogeneity have, therefore, been made with regard to various reference solution; values for the revenue and expenditure components by the two levels of government. It is found that on the revenue side the percentages of exogenous revenue items (in nominal terms) to the total revenues by levels of government turn out to be not that significant.¹⁵ On the expenditure side, however, interest payments on public debt for both levels of government remain a thorny issue since their size alone takes an important part (more than five per cent) in the total government expenditure. With increased inflation under alternative simulations, it is expected that interest payments on public debt cannot be assumed to remain exogenous as governments have to enter into new borrowings with increasing interest rates under inflationary pressures, and, therefore, higher interest payments (see Laidler and Parkin). Currently, some efforts are being made to endogenize interest payments on public debt along with other variables (now exogenous) in CANDIDE 1.2M, the full impact of which can be analyzed later on.

14 See Appendix A where the exogenous variables are symbolized by a single asterisk.

15 Over the period, 1976-85, these percentages are less than 5 per cent. This applies to all the reference solutions covered under this study.

Finally, the other pressing issues especially facing the whole government sector are currently those relating to the objectives of balanced budgets (either at federal level or nonfederal level or both) with or without a desired level of money supply and debt financing, internal and external. Obviously these issues are sufficiently serious to have far-reaching consequences on not only the levels of over-all government expenditures and revenues but also on the priorities as to which items of expenditures or revenues have to be pruned or expanded. This may call for a recasting of even some existing endogenous expenditure or revenue equations by some new arrangements like tax-sharing formula between provinces and federal government or other joint agreements between levels of government. Furthermore, there is a growing concern that the days of local government's subservience to provincial governments or even federal government (whenever such a jurisdiction exists) seems to be fast passing by. This is an issue which makes model-building on decision-making of a three-tier system interesting but somewhat hazardous as the political economy of such a system borders on many legal and political jurisdictions.

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Table 1

Results of Budgetary Position of Government Sector, Federal, Nonfederal, and Total, and Other Macro-Variables in an Inflationary Scenario Generated by 1 Per Cent Wage Shock (1976 only) to Reference Solution 1 of CANDIDE 1.2M, 1976-85

(All values are in millions of current dollars except otherwise indicated; 'A' refers to the reference solution values and C-A indicates shocked solution minus reference solution)

Year	Total Government Revenue		Total Government Expenditure		Total Government Budget		Federal Government Budget		Nonfederal Government Budget		GNE Deflator		Real GNE		Unemployment Rate		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	
	(GOVREV, 36.03)	C-A	A	(GOVEXP, 36.04)	C-A	A	(GBALF, 19.96)	C-A	A	(GBALJ, 19.80)	C-A	(PGNE, 24.42)	A	C-A	(GNEXPK, 24.41)	A	C-A
1976	57,443	415	73,298	521	-3052.7	-94.4	-3499.9	-4.2	447.4	-90.2	2.15	.01	84,263	-2	6.70	.07	
1977	77,020	712	83,375	834	-3093.7	-97.2	-3136.3	16.9	42.8	-114.2	2.35	.02	87,692	1	7.02	.06	
1978	57,769	1,067	53,960	1,233	-2453.6	-122.2	-1851.0	23.2	-602.5	-145.3	2.54	.04	92,345	-37	6.66	.09	
1979	100,350	1,560	105,630	1,700	-992.6	-70.3	659.1	117.6	-1651.5	-188.1	2.75	.05	97,711	-7	6.11	.07	
1980	114,310	2,170	119,770	2,280	-506.2	-5.5	2487.0	264.2	-2993.2	-269.7	2.99	.06	103,130	50	5.50	.04	
1981	135,050	3,180	136,550	3,050	4145.4	252.7	7855.3	571.8	-3709.9	-319.3	3.25	.08	107,250	70	5.47	.03	
1982	150,740	4,120	154,970	3,960	2187.9	314.7	8775.8	769.0	-6587.9	-454.4	3.52	.10	111,150	140	5.58	.01	
1983	167,750	5,250	175,200	5,080	-174.6	389.0	9996.3	1024.7	-10,171	-636.0	3.82	.12	114,870	180	5.58	-.09	
1984	187,760	6,630	197,430	6,400	-1435.6	504.9	12,327	1359.0	-13,763	-854.0	4.14	.14	119,600	230	5.22	-.02	
1985	209,230	8,220	224,640	8,080	-6052.0	494.7	12,753	1652.0	-18,805	-1157.0	4.49	.17	122,930	280	5.61	-.03	

(Millions of 1961 dollars)

(1961=1)

Note: For explanations see the text. Variables within brackets are CANDIDE variables with block and equation numbers. In CANDIDE, Col. (5) is not equal to the difference between Col. (1) and Col. (3) because of certain capital consumption allowances, an additive term in the identity equation of GOVBAL, which is not included in GOVREV or GOVEXP. Similarly, Col. (6) is not equal to the difference between Col. (2) and Col. (4). However, Col. (5) is the sum of Col. (7) and Col. (9) and so is Col. (6) as a sum of Col. (8) and Col. (10). Any discrepancy here is due to rounding.

Table 1*

Results of Budgetary Position of Government Sector, Federal, Nonfederal, and Total, and Other Macro-Variables in an Inflationary Scenario Generated by 1 Per Cent Wage Shock (1976 only) to Reference Solution 1 of CANDIDE 1.2M, 1976-85

(All values are in millions of current dollars except otherwise indicated; 'A' refers to the reference solution values and B-A indicates shocked solution minus reference solution)

Year	Total Government Revenue		Total Government Expenditure		Total Government Budget		Federal Government Budget		Nonfederal Government Budget		Real GNE		Unemployment Rate (URATE)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)		(13)	(14)	(15)
	Same as Table 1	418	Same as Table 1	488	Same as Table 1	57.1	Same as Table 1	42.9	Same as Table 1	-100.2	Same as Table 1	Same as Table 1	Same as Table 1	nil	Same as Table 1	nil
	Table 1	715	Table 1	776	Table 1	36.4	Table 1	72.2	Table 1	-108.8	Table 1	Table 1	Table 1	"	Table 1	"
		A	A	A	A	A	A	B-A	B-A	B-A	A	B-A	A	B-A	A	B-A
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
	(Millions of 1961 dollars)															
	(1961=1)															
1976	Same as Table 1	418	Same as Table 1	488	Same as Table 1	57.1	Same as Table 1	42.9	Same as Table 1	-100.2	Same as Table 1	Same as Table 1	Same as Table 1	nil	Same as Table 1	nil
1977	Table 1	715	Table 1	776	Table 1	36.4	Table 1	72.2	Table 1	-108.8	Table 1	Table 1	Table 1	"	Table 1	"
1978		1,093		1,110		24.3		139.3		-115.1		.04		"		"
1979		1,560		1,540		84.7		230.8		-146.4		.05		"		"
1980		2,110		2,050		143.9		343.8		-200.2		.06		"		"
1981		3,080		2,690		493.2		676.8		-183.8		.07		"		"
1982		3,900		3,440		601.3		861.5		-260.5		.10		"		"
1983		4,870		4,290		762.8		1,107.7		-345.0		.11		"		"
1984		6,010		5,260		984.5		1,422.0		-437.0		.13		"		"
1985		7,290		6,450		1126.3		1,698.0		-572.0		.15		"		"

Note: For explanations see the text. Cols. (14) and (15) have only zero values since Solution B and Solution A are the same values with Solution B obtained by exogenizing all real and activity variables of Solution A. The real variables are in Blocks 1-12, 23, 25, 32 and 39 of CANDIDE 1.2M.

Table 2

Results of Budgetary Position of Government Sector, Federal, Nonfederal, and Total, and Other Macro-Variables in an Inflationary Scenario Generated by 5 Per Cent Wage Shock (1976 only) to Reference Solution 1 of CANDIDE 1.2M, 1976-85

(All values are in millions of current dollars except otherwise indicated; 'A' refers to the reference solution values and C-A indicates shocked solution minus reference solution)

Year	Total Government Revenue		Total Government Expenditure		Total Government Budget		Federal Government Budget		Nonfederal Government Budget		Real GNE		Unemployment Rate				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	
	(GOVREV, 36.03)	(GOVEXP, 36.04)	(GOVBAL, 36.06)	(GBALF, 19.96)	(GBALJ, 19.80)	(GNE, 24.42)	(GNEXP, 24.41)										
	A	C-A	A	C-A	A	C-A	A	C-A	A	C-A	A	C-A	A	C-A	A	C-A	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	
	Same as Table 1	Same as Table 1	Same as Table 1	Same as Table 1	Same as Table 1	Same as Table 1	Same as Table 1	Same as Table 1	Same as Table 1	Same as Table 1	Same as Table 1	Same as Table 1	Same as Table 1	Same as Table 1	Same as Table 1	Same as Table 1	
1976	2,082	2,606	-456.5	-15.0	-451.7	0.07	-17	Same as Table 1	Same as Table 1	Same as Table 1	Same as Table 1	Same as Table 1	Same as Table 1	Same as Table 1	Same as Table 1	Same as Table 1	
1977	3,114	3,893	-666.7	9.3	-675.7	0.10	155	79	430	880	1,050	1,280	1,460	1,650	1,850	0.27	
1978	4,244	5,273	-851.0	42.2	-893.2	0.14											0.27
1979	5,810	6,600	-548.2	569.1	-1,117.5	0.17											0.09
1980	7,740	8,290	-217.9	1,284.8	-1,502.8	0.20											-0.14
1981	10,780	10,560	538.5	2,353.7	-1,815.3	0.25											-0.22
1982	13,430	13,400	561.0	2,966.2	-2,405.2	0.30											-0.29
1983	16,630	16,730	586.7	3,737.7	-3,151.0	0.36											-0.43
1984	20,580	20,670	767.0	4,780.0	-4,013.0	0.44											-0.41
1985	25,200	25,750	535.2	5,969.0	-5,161.0	0.51											-0.48

Note: See Table 1 and the text for explanations.

Table 2 *

Results of Budgetary Position of Government Sector, Federal, Nonfederal, and Total, and Other Macro-Variables in an Inflationary Scenario Generated by 5 Per Cent Wage Shock (1976 only) to Reference Solution 1 of CANDIDE 1.2M, 1976-85

(All values are in millions of current dollars except otherwise indicated; 'A' refers to the reference solution values and B-A indicates shocked solution minus reference solution)

Year	Total Government Revenue		Total Government Expenditure		Total Government Budget		Federal Government Budget		Nonfederal Government Budget		GNE Deflator		Real GNE		Unemployment Rate	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
	A	B-A	A	B-A	A	B-A	A	B-A	A	B-A	A	B-A	A	B-A	A	B-A
1976	Same as Table 1	2,105	Same as Table 1	2,437	Same as Table 1	-272.6	Same as Table 1	224.2	Same as Table 1	-497.0	Same as Table 1	.07	Same as Table 1	nil	Same as Table 1	nil
1977	Table 1	3,004	Table 1	3,677	Table 1	-561.2	Table 1	145.3	Table 1	-706.7	Table 1	.10	Table 1	"	"	"
1978		4,106		4,763		-488.8		332.7		-821.8		.13		"	"	"
1979		5,300		6,000		-466.0		575.8		-1042.3		.17		"	"	"
1980		6,640		7,410		-474.1		854.9		-1329.4		.19		"	"	"
1981		9,110		9,090		390.0		1,775.6		-1385.9		.23		"	"	"
1982		10,920		10,950		427.1		2,160.2		-1733.7		.27		"	"	"
1983		13,020		12,990		585.7		2,686.7		-2101.0		.31		"	"	"
1984		15,500		15,260		907.1		3,385.0		-2478.0		.35		"	"	"
1985		18,200		18,060		940.3		3,925.0		-2985.0		.39		"	"	"

(Millions of 1961 dollars) (Per cent)

Note: See Table 1* for explanations.

Table 3

Results of Budgetary Position of Government Sector, Federal, Nonfederal, and Total, and Other Macro-Variables in an Inflationary Scenario Generated by 1 Per Cent Wage Shock (in 1976 only) to Reference Solution 2 of CANDIDE 1.2M, 1976-85

(All values are in millions of current dollars except otherwise indicated; 'A' refers to the reference solution values and C-A indicates shocked solution minus reference solution)

Year	Total Government Revenue		Total Government Expenditure		Total Government Budget		Federal Government Budget		Nonfederal Government Budget		Real GNE (GNEXPK, 24.41)		GNE Deflator (PGNE, 24.42)		Unemployment Rate (URATE)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
1976	70,299	566.7	73,511	589.3	-406.8	-6.8	-1787.8	46.9	1381.2	-53.9	2.15	.02	83,065	-51.1	7.25	.09
1977	79,690	910.7	83,194	990.0	12.9	-46.7	-1308.6	35.9	1321.5	-82.1	2.35	.03	86,184	-62.6	7.80	.10
1978	90,506	1337.9	93,496	1474.5	803.4	-82.6	-114.7	30.5	918.4	-113.1	2.54	.04	90,143	-127.8	7.73	.14
1979	102,680	1918.5	104,600	2002.5	2527.6	-5.4	2294.2	145.4	233.6	-150.8	2.75	.06	94,786	-89.8	7.45	.12
1980	116,690	2668.8	117,750	2653.8	3784.1	123.7	4285.8	343.8	-501.7	-219.9	2.96	.07	99,774	-4.3	7.01	.08
1981	130,960	3568.9	132,780	3485.7	3695.4	228.4	6252.2	567.0	-2557.3	-338.0	3.19	.09	105,270	68.7	6.46	.05
1982	145,860	4620.9	150,390	4517.9	1729.0	292.7	7199.2	767.6	-5470.2	-504.9	3.45	.11	103,250	140.3	6.38	.02
1983	162,120	5876.7	169,100	5716.2	79.4	402.8	8781.8	1108.4	-9702.3	-705.8	3.72	.13	113,500	220.8	6.07	-.003
1984	181,140	7411.4	189,830	7138.2	-462.1	579.1	11,534	1526.4	-11,997	-947.3	4.00	.16	118,750	300.7	5.59	-.03
1985	201,370	9133.4	215,490	8974.8	-5082.3	545.4	11,810	1844.6	-16,892	-1299.1	4.32	.19	122,090	361.3	5.89	-.06

(Millions of 1961 dollars)

Note: See Table 1 for explanations.

Table 3*

Results of Budgetary Position of Government Sector, Federal, Nonfederal, and Total, and Other Macro-Variables in an Inflationary Scenario Generated by 1 Per Cent Wage Shock (in 1976 only) to Reference Solution 2 of CANDIDE 1.2M, 1976-85

(All values are in millions of current dollars except otherwise indicated; 'A' refers to the reference solution values and B-A indicates shocked solution minus reference solution)

Year	Total Government Revenue		Total Government Expenditure		Total Government Budget		Federal Government Budget		Nonfederal Government Budget		GNE Deflator (PGNE, 24.42)		Real GNE (GNEXPK, 24.41)		Unemployment Rate (URATE)	
	A (1)	B-A (2)	A (3)	B-A (4)	A (5)	B-A (6)	A (7)	B-A (8)	A (9)	B-A (10)	A (11)	B-A (12)	A (13)	B-A (14)	A (15)	B-A (16)
(1961=1) (Millions of 1961 dollars) (Per cent)																
1976	Same as Table 3	610.8	Same as Table 3	539.7	Same as Table 3	86.9	Same as Table 3	134.6	Same as Table 3	- 48.2	Same as Table 3	.02	Same as Table 3	nil	Same as Table 3	nil
1977	977.3	977.3	921.1	921.1	88.4	88.4	154.8	154.8	66.8	66.8	.03	.03	.03	.03	.03	.03
1978	1460.9	1460.9	1332.8	1332.8	179.6	179.6	245.4	245.4	- 66.0	- 66.0	.04	.04	.04	.04	.04	.04
1979	2030.4	2030.4	1834.2	1834.2	270.4	270.4	362.3	362.3	- 92.1	- 92.1	.06	.06	.06	.06	.06	.06
1980	2703.7	2703.7	2429.6	2429.6	375.0	375.0	510.9	510.9	-136.2	-136.2	.07	.07	.07	.07	.07	.07
1981	3504.4	3504.4	3127.0	3127.0	509.3	509.3	708.4	708.4	-198.9	-198.9	.09	.09	.09	.09	.09	.09
1982	4414.3	4414.3	3956.2	3956.2	626.4	626.4	915.8	915.8	-289.5	-289.5	.11	.11	.11	.11	.11	.11
1983	5455.4	5455.4	4867.4	4867.4	797.8	797.8	1185.8	1185.8	-388.4	-388.4	.13	.13	.13	.13	.13	.13
1984	6695.8	6695.8	5894.2	5894.2	1060.0	1060.0	1547.1	1547.1	-487.4	-487.4	.15	.15	.15	.15	.15	.15
1985	8059.0	8059.0	7181.5	7181.5	1195.2	1195.2	1837.3	1837.3	-642.3	-642.3	.17	.17	.17	.17	.17	.17

Note: See Table 3 and Table 1* for explanations.

Table 4

Results of Budgetary Position of Government Sector, Federal, Nonfederal, and Total, and Other Macro-Variables in an Inflationary Scenario Generated by 1 Per Cent Wage Shock (from 1976 through 1985) to Reference Solution 2 of CANDIDE 1.2M, 1976-85

(All values are in millions of current dollars except otherwise indicated; 'A' refers to the reference solution values C-A indicates shocked solution minus reference solution)

Year	Total Government Revenue		Total Government Expenditure		Total Government Budget		Federal Government Budget		Nonfederal Government Budget		GNE Deflator (PGNE, 24.42)		Real GNE (GNEXPK, 24.41)		Unemployment Rate (URATE)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
	Same as Table 3	566.7	Same as Table 3	589.3	Same as Table 3	-6.9	Same as Table 3	46.9	Same as Table 3	-53.9	Same as Table 3	.02	Same as Table 3	-51.1	Same as Table 3	.09
		1409.7	1582.3	1582.3	-126.4	126.4	56.1	182.3	182.3	.04	.04	67.1	67.1	67.1	.17	.17
		2600.3	3003.1	3003.1	-308.2	308.2	73.3	381.6	381.6	.08	.08	105.6	105.6	105.6	.25	.25
		4283.4	4844.8	4844.8	-398.2	398.2	260.9	659.1	659.1	.12	.12	38.3	38.3	38.3	.28	.28
		6626.8	7242.6	7242.6	-359.3	359.3	701.6	1060.6	1060.6	.17	.17	171.3	171.3	171.3	.23	.23
		9750.5	10,346	10,346	-213.9	213.9	1427.4	1640.8	1640.8	.23	.23	480.6	480.6	480.6	.15	.15
		12,709	14,384	14,384	-130.1	130.1	2347.6	2477.4	2477.4	.31	.31	861.3	861.3	861.3	.04	.04
		18,757	19,367	19,367	141.9	141.9	3687.2	3545.6	3545.6	.40	.40	1331.6	1331.6	1331.6	-.10	-.10
		25,299	25,624	25,624	694.4	694.4	5603.3	4909.1	4909.1	.51	.51	1879.6	1879.6	1879.6	-.26	-.26
		33,176	34,001	34,001	550.0	550.0	7454.3	6904.2	6904.2	.64	.64	2400.5	2400.5	2400.5	-.44	-.44

Note: See Table 3. The difference between Table 3 and the present table brings out the impact of sustained shock vis-a-vis one period shock.

Table 4*

Results of Budgetary Position of Government Sector, Federal, Nonfederal, and Total, and Other Macro-Variables in an Inflationary Scenario Generated by 1 Per Cent Wage Shock (from 1976 through 1985) to Reference Solution 2 of CANDIDE 1.2M, 1976-85

(All values are in millions of current dollars except otherwise indicated; 'A' refers to the reference solution values B-A indicates shocked solution minus reference solution)

Year	Total Government Revenue		Total Government Expenditure		Total Government Budget		Federal Government Budget		Nonfederal Government Budget		GNE Deflator		Real GNE		Unemployment Rate		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	
	Same as Table 3	610.8	Same as Table 3	539.7	Same as Table 3	86.9	Same as Table 3	134.6	Same as Table 3	48.2	Same as Table 3	.02	Same as Table 3	nil	Same as Table 3	nil	
	1487.7	(GOVREV, 36.03)	1478.6	(GOVEXP, 36.04)	55.3	(GOVBAL, 36.06)	232.0	(GBALF, 19.96)	176.9	(GBALJ, 19.80)	.04	(PGNE, 24.42)	(GNEXP, 24.41)	(URATE)			
	A	B-A	A	B-A	A	B-A	A	B-A	A	B-A	A	B-A	A	B-A	A	B-A	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	
(Millions of 1961 dollars)																	
1976	Same as Table 3	610.8	Same as Table 3	539.7	Same as Table 3	86.9	Same as Table 3	134.6	Same as Table 3	48.2	Same as Table 3	.02	Same as Table 3	nil	Same as Table 3	nil	
1977	2722.3	4365.0	2772.6	4469.4	395.9	662.4	1051.0	1626.4	2292.4	-353.9	-609.6	-972.9	-1455.1	-2109.8	-2892.7	-3808.4	-5089.6
1978	6496.5	9214.3	6661.8	9398.2	1626.4	2292.4	3220.8	4523.9	5653.3								
1979	12,519	16,545	12,833	16,889													
1980	21,574	27,373	21,747	27,976													
1981																	
1982																	
1983																	
1984																	
1985																	

Note: See Table 3, 4 and Table 3* for comparisons.

Table 5

Results of Macro-Variables Relating to Government Sector, Federal and Nonfederal, in an Inflationary Scenario Generated by Shocks to Indirect Tax Rates with Reference to a Particular Reference Solution of CANDIDE 1.2M, 1976-85

(All values are in current million dollars except otherwise indicated; 'A' refers to the reference solution values and C-A indicates shocked solution minus reference solution)

Year	Total Government Revenue		Total Government Expenditure		Total Government Budget		Federal Government Budget		Nonfederal Government Budget		GNE Deflator (PGNE, 24.42)		Real GNE (GNEXP, 24.41)		Unemployment Rate (URATE)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
	A	C-A	A	C-A	A	C-A	A	C-A	A	C-A	A	C-A	A	C-A	A	C-A
1976	70,299	440	73,511	62	- 407	382	- 1,788	- 96	1,381	477	2.15	.009	83,065	-228	7.25	.082
1977	79,690	476	83,194	101	13	381	- 1,307	-173	1,322	554	2.35	.011	86,184	-263	7.80	.127
1978	96,586	517	93,496	171	803	354	- 115	-266	918	620	2.54	.013	90,143	-371	7.73	.181
1979	102,880	540	104,600	172	2,528	378	2,294	-321	234	699	2.75	.015	94,786	-429	7.45	.198
1980	116,690	624	117,750	124	3,784	511	4,286	-307	502	817	2.96	.015	99,774	-416	7.01	.188
1981	130,960	683	132,780	95	3,695	601	6,252	-326	2,557	927	3.19	.015	105,270	-428	6.46	.185
1982	145,860	696	150,390	38	1,729	669	7,199	-365	5,470	1,035	3.45	.015	109,250	-442	6.38	.185
1983	162,120	686	169,100	50	79	746	8,782	-420	8,702	1,166	3.72	.014	113,500	-467	6.07	.191
1984	181,140	638	189,490	184	- 462	829	11,534	-494	11,997	1,323	4.00	.013	118,750	-504	5.59	.198
1985	201,370	508	215,490	397	-5,082	906	11,810	-587	16,892	1,494	4.32	.010	122,090	-540	5.89	.204

Note: The shock here refers to 10 per cent increase in indirect tax rates from 1976 through 1985 and is applied to Reference Solution 2 of CANDIDE 1.2M as mentioned in the text.

Table 5*

Results of Macro-Variablies Relating to Government Sector, Federal and Nonfederal, in an Inflationary Scenario Generated by Shocks to Indirect Tax Rates with Reference to a Particular Reference Solution of CANDIDE 1.2M, 1976-85
(All values are in current million dollars except otherwise indicated; "A" refers to the reference solution values and B-A indicates the difference between shocked solution and reference solution)

Year	Total Government Revenue		Total Government Expenditure		Total Government Budget		Federal Government Budget		Nonfederal Government Budget		GNE Deflator		Real GNE		Unemployment Rate	
	A (1)	B-A (2)	A (3)	B-A (4)	A (5)	B-A (6)	A (7)	B-A (8)	A (9)	B-A (10)	A (11)	B-A (12)	A (13)	B-A (14)	A (15)	B-A (16)
	(G _{REV} , 36.03)		(G _{EXP} , 36.04)		(G _{BAL} , 36.06)	(F _{BAL} , 19.96)	(N _{BAL} , 19.80)	(P _{GNE} , 24.42)	(P _{GNE} , 24.42)	(G _{NEPK} , 24.41)	(U _{FATE})					
1976	70,299	599	73,511	18	- 407	584	-1,788	50	1,381	536	2.15	.007	83,065	--	7.25	--
1977	79,960	710	83,194	122	13	595	-1,307	18	1,322	577	2.35	.011	86,184	--	7.80	--
1978	96,586	871	93,496	208	903	674	- 115	25	918	649	2.54	.013	90,143	--	7.73	--
1979	102,880	1,018	104,600	284	2,528	749	2,294	32	234	717	2.75	.016	94,786	--	7.45	--
1980	116,690	1,180	117,750	356	3,784	842	4,286	45	- 502	797	2.96	.018	99,774	--	7.01	--
1981	130,960	1,352	132,780	427	3,695	947	6,252	59	- 2,557	888	3.19	.020	105,270	--	6.46	--
1982	145,860	1,516	150,390	501	1,729	1,041	7,199	70	- 5,470	971	3.45	.022	109,250	--	6.38	--
1983	162,120	1,701	169,100	573	79	1,159	8,782	85	- 8,702	1,074	3.72	.024	113,500	--	6.07	--
1984	181,140	1,914	189,490	645	- 462	1,305	11,534	109	-11,997	1,195	4.00	.026	118,750	--	5.59	--
1985	201,370	2,117	215,490	733	-5,082	1,424	11,810	121	-16,892	1,303	4.32	.028	122,090	--	5.89	--

Note: See Table 5. The same shock is administered to Reference Solution 2 as in Table 5 subject to the condition that all real variables are fixed at the reference solution values.

Table 6

Results of Government Budget, Federal, Nonfederal and Total, and Other Macro-Variables Under an Inflationary Scenario Generated by 10 Per Cent Devaluation of the Exchange Rate as Applied to a Particular Reference Solution of CANDIDE 1.2M, 1976-85

(All values are in millions of current dollars, except where indicated otherwise. A denotes Reference Solution; C-A refers to difference between shocked Solution and Reference Solution)

Year	Total Government Revenue		Total Government Expenditure		Total Government Budget		Federal Government Budget		Nonfederal Government Budget		GNE Deflator (PGNE, 24.42)		Real GNE (GNEXP, 24.41)		Unemployment Rate (URATE)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
	A	C-A	A	C-A	A	C-A	A	C-A	A	C-A	A	C-A	A	C-A	A	C-A
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
	(Millions of 1961 dollars)															
	(1961=1)															
	(Per cent)															
1976	69,501	2,078	74,763	-28	-2,345	2,174	-2,855	1,644	510	530	2.158	.0262	84,935	431	6.955	-.453
1977	78,735	1,802	82,179	210	-134	1,678	-924	1,271	791	407	2.286	.0390	90,389	897	6.048	-.616
1978	88,097	2,241	90,359	485	1,360	1,870	905	1,421	459	449	2.401	.0483	95,425	981	5.308	-.663
1979	99,786	3,188	100,170	1,055	3,712	2,290	3,630	1,767	82	522	2.474	.0696	100,250	890	4.809	-.628
1980	112,940	4,519	113,630	2,046	4,017	2,687	5,121	2,164	-1,103	523	2.818	.100	104,150	804	4.938	-.584
1981	126,260	5,742	129,650	3,383	1,985	2,639	4,945	2,292	-2,960	346	3.079	.133	107,370	666	5.529	-.517
1982	139,490	6,932	147,100	4,896	-1,507	2,391	4,169	2,308	-5,679	83	3.343	.165	110,100	549	6.048	-.456
1983	155,040	8,390	164,890	6,466	-2,993	2,361	5,438	2,557	-8,431	196	3.606	.198	113,870	574	5.975	-.455
1984	173,420	10,111	184,530	8,273	-3,405	2,368	7,671	2,920	11,075	-	552	3.874	118,310	673	5.845	-.480
1985	194,290	12,111	206,870	10,402	-3,947	2,343	10,546	3,380	14,493	-1,036	4.161	.268	122,720	790	5.735	-.507

Note: Reference Solution refers to Reference Solution 3 as mentioned in the text. The devaluation is sustained from 1976 through 1985.

Table 6 *

Results of Government Budget, Federal, Nonfederal and Total, and Other Macro-Variables Under an Inflationary Scenario Generated by 10 Per Cent Devaluation of the Exchange Rate as Applied to a Particular Reference Solution of CANDIDE 1.2M, 1976-85

(All values are in millions of current dollars, except where indicated otherwise. A denotes Reference Solution; B-A refers to difference between Shocked Solution and Reference Solution.)

Year	Total Government Revenue		Total Government Expenditure		Total Government Budget		Federal Government Budget		Nonfederal Government Budget		GNE Deflator (PGNE, 24.42)		Real GNE (GNEXPK, 24.41)		Unemployment Rate (URATE)	
	A (1)	B-A (2)	A (3)	B-A (4)	A (5)	B-A (6)	A (7)	B-A (8)	A (9)	B-A (10)	A (11)	B-A (12)	A (13)	B-A (14)	A (15)	B-A (16)
1976	69,501	1,951	74,763	170	-2,346	1,845	-2,855	1,245	510	600	2.158	.028	84,935	nil	6.955	nil
1977	78,785	1,313	82,179	392	134	1,002	-924	587	791	414	2.286	.070	90,389	"	6.048	"
1978	88,097	1,634	90,359	509	1,360	1,226	905	707	459	519	2.401	.046	95,425	"	5.308	"
1979	99,786	2,330	100,170	748	3,712	1,712	3,630	1,053	82	659	2.474	.058	100,250	"	4.809	"
1980	112,940	3,108	113,630	1,103	4,017	2,170	5,121	1,396	-1,103	774	2.818	.073	104,150	"	4.938	"
1981	126,260	3,641	129,650	1,434	1,985	2,400	4,945	1,574	-2,960	826	3.079	.084	107,370	"	5.529	"
1982	139,490	4,030	147,100	1,724	-1,507	2,527	4,169	1,676	-5,679	851	3.343	.093	110,100	"	6.048	"
1983	155,040	4,443	164,890	1,994	-2,993	2,700	5,438	1,822	-8,431	878	3.606	.101	113,870	"	5.975	"
1984	173,420	4,857	184,530	2,262	-3,405	2,875	7,671	1,972	11,075	903	3.874	.108	118,310	"	5.845	"
1985	194,290	5,261	206,870	2,499	-3,947	3,072	10,546	2,128	14,493	944	4.161	.114	122,720	"	5.735	"

(Millions of 1961 dollars)

(1961=1)

(Per cent)

Note: Reference Solution refers to Reference Solution 3 as mentioned in the text. The devaluation is sustained from 1976 through 1985.

Table 7

Results of Government Budget, Federal, Nonfederal and Total, and Other Macro-Variables Under an Inflationary Scenario Generated by Sustained Shocks to Certain Export and Import Prices (1976 through 1985) with Reference to a Particular Reference Solution of CANDIDE 1.2M, 1976-85

(All values are in millions of current dollars except otherwise indicated. 'A' refers to the Reference Solution values and C-A indicates the difference between the Shocked Solution and Reference Solution)

Year	Total Government Revenue		Total Government Expenditure		Total Government Budget		Federal Government Budget		Nonfederal Government Budget		GNE Deflator (PGNE, 24.42)		Real GNE (GNEXPK, 24.41)		Unemployment Rate (URATE)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
1976	67,443	536	73,298	134	-3,053	413	-3,500	290	447	124	2.15	.016	84,263	-209	6.70	.028
1977	77,020	444	83,375	386	-3,094	79	-3,136	34	43	44	2.35	.023	87,692	-117	7.02	.053
1978	87,769	640	93,960	692	-2,454	-17	-1,851	-21	603	4	2.54	.030	92,345	-173	6.66	.087
1979	100,350	883	105,630	901	-993	26	659	50	-1,652	-24	2.75	.035	97,711	-124	6.11	.061
1980	114,340	1,238	119,770	1,117	-506	177	2,487	212	-2,993	-35	2.99	.040	103,130	-16	5.50	.018
1981	135,050	1,626	136,550	1,483	4,145	216	7,855	278	-3,710	-62	3.25	.046	107,250	-70	5.47	.038
1982	150,740	1,791	154,970	1,862	2,188	17	8,776	138	-6,588	-120	3.52	.051	111,150	-188	5.58	.090
1983	167,750	1,948	175,200	2,182	-175	-128	9,996	42	-10,171	-170	3.82	.057	114,870	-266	5.58	.116
1984	187,760	2,199	197,430	2,440	-1,436	-117	12,327	93	-13,763	-211	4.14	.062	119,600	-258	5.22	.099
1985	209,230	2,551	224,640	2,761	-6,052	-65	12,753	193	-18,805	-258	4.49	.068	122,930	-227	5.61	.071

Note: Reference Solution here refers to Reference Solution 1 as mentioned in the text.

Table 7*
 Results of Government Budget, Federal, Nonfederal and Total, and Other Macro-Variables Under an Inflationary Scenario Generated by Sustained Shocks to Certain Export and Import Prices (1976 through 1985) with Reference to a Particular Reference Solution of CANDIDE 1.2M, 1976-85
 (All values are in millions of current dollars except otherwise indicated; "A" refers to the reference solution values and B-A indicates the difference between the shocked solution and reference solution)

Year	Total Government Revenue		Total Government Expenditure		Total Government Budget		Federal Government Budget		Nonfederal Government Budget		Real GNE		Unemployment Rate			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
	(G _{REV} , 36.03)	B-A	(G _{EXP} , 36.04)	B-A	(G _{BAL} , 36.06)	B-A	(G _{FALF} , 19.96)	B-A	(G _{BALJ} , 19.80)	B-A	(G _{NE} , 24.42)	B-A	(G _{NEXPK} , 24.41)	B-A	(URATE)	(URATE)
1976	67,443	675	73,298	88	-3,053	594	-3,500	384	447	211	2.15	.015	84,263	--	6.70	--
1977	77,020	577	83,375	365	-3,094	230	-3,136	134	43	96	2.35	.022	87,692	--	7.02	--
1978	87,769	840	93,960	588	-2,454	281	-1,851	162	-603	119	2.54	.028	92,345	--	6.56	--
1979	100,350	1,122	105,630	789	-993	373	659	230	-1,652	143	2.75	.032	97,711	--	6.11	--
1980	114,340	1,448	119,770	970	-506	526	2,487	331	-2,993	195	2.99	.036	103,130	--	5.50	--
1981	135,050	1,946	136,550	1,160	4,145	844	7,855	527	-3,710	317	3.25	.040	107,250	--	5.47	--
1982	150,740	2,355	154,970	1,345	2,188	1,079	8,776	632	-6,588	447	3.52	.043	111,150	--	5.58	--
1983	167,750	2,844	175,200	1,532	-175	1,391	9,996	753	-10,171	638	3.82	.047	114,870	--	5.58	--
1984	187,760	3,463	197,430	1,729	-1,436	1,825	12,327	908	-13,763	916	4.14	.050	119,600	--	5.22	--
1985	209,230	4,273	224,640	1,968	-6,052	2,410	12,753	1,102	-18,805	1,307	4.49	.054	122,930	--	5.61	--

Note: See Table 7.

APPENDIX

Appendix

Components of Current Dollar Revenues and Expenditures of Federal and Nonfederal Governments, CANDIDE 1.2M (with CANDIDE mnemonics)

(Exogenous variables are starred (single asterisk) and constant dollar variables, wherever available, are double-starred (double asterisk))

Federal Government Revenue Items

1. Direct Taxes:

(i) Direct Taxes on Persons (TPF):

- (a) Personal Income (TIPF)
- (b) Succession Duties and Taxes (SUCDUF)*
- (c) Contributions to Public Service Pension Plans (PSPCF)*
- (d) Unemployment Insurance Contributions (TUI)

(ii) Direct Taxes on Corporation and Government Pensions (TCGAF):

- (a) Corporate Income Tax (TCAF)
- (b) Taxes on Government Enterprises (TGA)*

2. Nonresident Withholding Tax (TNR)

3. Indirect Taxes (TIF):

- (i) Custom Duties (TCUS)
- (ii) Manufactures Sales Tax (FSALES)
- (iii) Excise Duties (EXCISE)
- (iv) Other Indirect Taxes (FTØTH)*

4. Investment Income (GIIF):

- (i) Interest Receipts (GINTIF)
- (ii) Royalties (RØYALF)*
- (iii) Remittance from Federal Government Business Enterprises (REMGPF)

5. Transfers from Persons (TRPGF)*

Nonfederal Government Revenue Items

6. Direct Taxes
 - (i) Direct Taxes on Persons (TPJ):
 - (a) Personal Income Taxes (TIPP)
 - (b) Succession Duties (SUCDUP)*
 - (c) Contributions to Public Service Pension Plans (PSPCJ)*
 - (d) Workmen's Compensation (TWCV)*
 - (e) Canada and Quebec Pension Plan contributions (CQPC)
 - (ii) Corporations and Government Business (TCGAP):
 - (a) Corporate Income Tax (TCAP)
 - (b) Mining and Logging Taxes (TMLP)*
7. Indirect Taxes (TIJ):
 - (i) Retail Sales Tax (TRS)
 - (ii) Gasoline Tax (GASTAX)
 - (iii) Profits of Liquor Control Boards (PRØLIQ)
 - (iv) Property Taxes (TPRØP)
 - (v) Other Indirect Taxes (JTØTH)
8. Investment Income (GIIJ):
 - (i) Indirect Receipts (GINTIJ)
 - (ii) Royalties (RØYALP)*
 - (iii) Remittances from Junior Government Enterprises (REMGPJ)
 - (iv) Interest Income on Hospitals and Canada -- Quebec Pension Plans (HCQPPII)
9. Transfers from Persons (TRPGJ)*
10. Transfers from Federal Government (FTRJG):
 - (i) Direct Relief (FTRDR)
 - (ii) Federal Transfers to Provinces Due to Taxation Agreements (FTRTA)
 - (iii) Post Secondary Education (FTRPS)
 - (iv) Hospital Insurance to Provinces (FTRHI)
 - (v) Transfers to Provinces -- Medicare (FTRMED)
 - (vi) Miscellaneous (FTRMIS)

Federal Government Expenditure Items

11. Federal Government Current Expenditure on Goods and Services (GFCURC):
 - (a) Federal Defence (FDEFEC, FDEFEK**)
 - (b) Hospital Depreciation (GFDEPC, GFDEPK**)
 - (c) Federal Wages and Salaries (GFWASC, GFWASK**)
 - (d) Current Expenditure on Goods and Services (GFCGSC, GFCGSK**)less (e) Canada Pension Plan (CPCGSC)
12. Federal Government Gross Capital Formation (GFFICC):
 - (a) Residential Construction (GRESCC, GRESCK,**, GRECK*)
 - (b) Government Building Excluding Schools (GFBOSC, GFBOSK,** GFBOSK*)
 - (c) Highway Construction (GFHWYC, GFHWYK,** GFHWYK*)
 - (d) Other Engineering Construction (GFØENC, GFØENK**)
 - (e) Investment in Machinery and Equipment (GFIMEC, GFIMEK**)
13. Change in Government Inventories (GØINSC, GØINSK**)
14. Transfer Payments to Persons (GTRF):
 - (a) Family and Youth Allowances (FAYA)
 - (b) Old Age Pensions (ØASPB)
 - (c) Unemployment Insurance Benefits (UIB)
 - (d) Pension Paid to Government Employees (FPENPA)*
 - (e) Other Transfers to Persons (GØTRF)*
15. Federal Government Subsidies (SUBF)*
16. Capital Assistance (CASF)*
17. Transfers to Nonresidents (FTRNR)*
18. Interest Payments on Public Debt (GINTF)*
19. Federal Government Transfers to Nonfederal Government (FTRJG):
 - (a) Direct Relief (FTRDR)
 - (b) Federal Transfers to Provinces Due to Taxation Agreements (FTRTA)
 - (c) Post Secondary Education (FTRPS)
 - (d) Hospital Insurance to Provinces (FTRHI)
 - (e) Transfers to Provinces -- Medicare (FTRMED)
 - (f) Miscellaneous (FTRMIS)

Nonfederal Expenditure Items

20. Current Expenditure on Goods and Services (GJCURC):

- (a) Capital Consumption Allowance (GJDEPC, GJDEPK**)
- (b) Provincial Government Wages and Salaries (GPWASC, GPWASK**)
- (c) Municipal Wages and Salaries (GLWSMC, GLWSMK**)
- (d) Municipal School Wages and Salaries (GLWSSC, GLWSSK**)
- (e) Hospital Wages and Salaries (GHWASC, GHWASK**)
- (f) Other current expenditure on Goods and Services (GPLGSC, GPLGSK**)
- (g) Hospital Residual Current Expenditure (GHCWSC, GHCWSC**)
- (h) Provincial Medicare (GPMEDC, GPMEDK**)
- (i) Canada Pension Plan, Current Expenditure (CPCGSC)

21. Provincial Government Gross Capital Formation (GJFICC):

- (a) School Construction (SCHCØC, SCHCØK**, SCHCOK*)
- (b) Building Other Than Schools (GJBØSC, GJBØSK**)
- (c) Highway Construction (GJHWYC, GJHWYK**)
- (d) Other Engineering Construction (GJØENC, GJØENK**)
- (e) Investment in Machinery and Equipment (GJIMEC, GJIMEK**)

less 22. Capital Consumption Allowance (GJDEPC, GJDEPK**)

23. Subsidies (SUBP)*

24. Capital Assistance (CASP)*

25. Interest Payments on Provincial Public Debt (GINTJ)*

26. Transfers to Persons (GTRJ):

- (a) Direct Relief (PWELF)
- (b) Grants to Post-Secondary Education (GRU)
- (c) Workmen's Compensation (PWCØMP)
- (d) Grants to Benevolent Association (PGBEN)
- (e) Civil Servant Pension Payments (JPENPA)*
- (f) Canada-Quebec Pension Benefits (CQPP)
- (g) Transfers to Persons (GØTRJ)*

Note There are other variables in CANDIDE 1.2M which are derived from the above items by algebraic summation. These are not shown here for the sake of brevity.

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