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DEFICITS AND DEBT RATIOS

DISCUSSION PAPER 85/1

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## DEFICITS AND DEBT RATIOS

### 1. INTRODUCTION

Politicians, business spokesmen, and some economists have sounded an alarm about government "deficits" and the accumulation of government debt. Labour spokesmen and some economists, have described the deficits and debt situation as a symptom of an economy running below its potential. They suggest deficit expansion is appropriate at this point in time, and increases in the amount of outstanding debt are not a matter of concern. Is there a problem with fiscal policy? Should the current focus of government policy be on deficit reduction, even if it means a continuation of high levels of unemployment? Or is it possible that deficit reduction will lead to more economic growth?

It would be presumptuous to believe that these questions can be answered definitively in this document. But perhaps some light can be shed on the issues and a framework for the on-going debate established.

## 2.0 WHAT ARE WE TALKING ABOUT?

### 2.1 What is meant by government?

The concern about government deficits and government debt presumes that the term "government" is well-defined. But this is not the case! In Canada, there are five levels of government - federal, provincial, local, hospitals, and public pensions. Some would go further and include in the term "government" those Crown corporations that produce goods and services (e.g., Canadian National, Air Canada, provincial Hydros). For our purposes, we will examine the federal level of government and exclude government business enterprises. The federal level is important for several reasons. At present, the federal deficit is the largest, and among the levels of government federal debt outstanding is the largest single component of total government debt. As well, one concern is that deficits or debts can be monetized; only the federal government can do so. But issues of "crowding out" refer to total government borrowing. With substantial transfers from the federal government to other levels of government it makes sense to look at the total government situation as well.

## 2.2 What deficit?

There are basically three choices - the public accounts budgetary balance, the public accounts financial requirements, and the National Accounts balance.\* For our purposes we will use the National Accounts concept since this allows for looking at both the federal and other levels of government in a consistent fashion. As well this information is available on a calendar-year basis rather than on a fiscal-year basis. This will allow us to relate the deficits to Gross National Expenditure in the same year.

Should we use the National Accounts budget balance as recorded, or make adjustments for inflation, cyclical factors, and other items? As useful as these adjustments are for judging the net thrust of fiscal policy, we will use the actual deficit, since we are examining interest burden, debt outstanding, and related issues. But the reader should remember that there are other deficit concepts.

\* For an excellent discussion of these concepts see:  
Department of Finance, The Federal Deficit in Perspective (April, 1983)

### 2.3 What debt and what ratio?

Several different approaches can be taken to measure the liabilities of the government. One approach is to use the Financial Flows information base and to construct a measure of net liabilities of the federal government. This measure has the advantage of including financial assets held by the federal government as an offset to their liabilities, and includes in liabilities a number of items in addition to treasury bills and bonds. But forecasts of net liabilities are not readily available within the modelling framework that we use.

Since much of the concern about the deficit and the size of debt revolves around financial markets and the interest costs to government of this debt, we have chosen to focus on the amount of debt outstanding in the form of treasury bills and bonds issued by government. Even with this approach there are several options - total debt outstanding, debt in the hands of the public, etc. The federal debt outstanding in the hands of the public and the chartered banks is perhaps the most useful indicator of federal government involvement in financial markets. Holdings by the Bank of Canada and the Government of Canada accounts place no net drain on the government to service this debt. (In the National Accounts government interest payments include the interest payments to the Bank of Canada and the government's own accounts, but this is offset by corresponding revenue items.)

The use of a ratio of debt to Gross National Product is conventional, but worthy of a few lines. The outstanding debt is an obligation of government fixed in nominal terms. For comparison over time some deflation would be appropriate to put it in constant dollars. To assess the real value of the debt it needs to be compared to some measure of the real size of the economy, reflecting the ability of governments to tax, or the base for servicing the debt. Equivalently, the ratio can be thought of as the nominal debt relative to the nominal income of the country.

### 3.0 THE FRAMEWORK

#### 3.1 The Deficit

In essence, the federal deficit is simply the difference between expenditure and revenue in a particular year. The balance can be expressed as:

$$[3.1] \quad B = \text{TOTREV} - \text{TOTEXP}$$

B = Government balance in year t

TOTREV = total revenue of government

TOTEXP = total expenditure by government

It is useful to distinguish certain categories of revenues and expenditures for subsequent analysis.

#### 3.2 Total Expenditure

Government expenditure can be disaggregated in a number of ways - by function, by program, and by the nature of the expenditure. For our purpose, expenditure will be defined as:

$$[3.2] \quad \text{TOTEXP} = G + \text{TR} + \text{INT}$$

G = Government expenditure on goods & services

TR = transfer payments by government

INT = interest payments on the public debt

### 3.3 Total Revenue

Revenue also can be disaggregated several ways - by tax system or by the type of income or expenditure taxed. For our purposes, revenue is defined as:

$$[3.3] \quad \text{TOTREV} = T + \text{TINT}$$

T = tax on earned income

TINT = tax on government interest income

### 3.4 Primary Balance

By substitution into [3.1] it is possible to define,

$$[3.4] \quad B = [T - G - \text{TR}] - [\text{INT} - \text{TINT}]$$

The first term is referred to as the primary balance, representing the tax revenue and expenditures excluding interest payments and the taxes on interest payments (the second term). The "primary" appellation can be traced to those functions of government that are the mainstream of their activity, whereas the second term relates to the net cost of financing past deficits.

### 3.5 Debt/GNP ratios

If we assume that any negative balance (deficit) is financed by issuing new government debt, and any positive balance (surplus) is used to retire debt, then the stock of outstanding debt (D) is defined as:

[3.5]  $D = D\langle -1 \rangle - B$

D = debt outstanding at the end of the period

$D\langle -1 \rangle$  = debt at end of previous period; beginning of this period

B = balance in the period

For simplification, we will assume that interest payments are based on the stock of debt at the beginning of this period. Therefore,

[3.7]  $INT = i D\langle -1 \rangle$

i = interest rate on outstanding debt

INT = total interest payments to the private sector

With the relationships defined so far, it is possible to define the debt-GNP ratio as:

[3.8]  $d = \frac{(1 + i(1-t'))}{(1+y)} d\langle -1 \rangle + g + h - t$ , or

$d = a d\langle -1 \rangle + p$

d = debt-GNP ratio, end of period

i = interest rate on outstanding debt in period t

y = growth rate of GNP in period t

g = ratio of government expenditure on goods and services to GNP

h = ratio of transfer payments to GNP

$t$  = taxes on GNP relative to GNP (excluding interest payments)

$t'$  = tax rate on interest payments

The expression  $(g + h - t)$  can be thought of as the primary deficit relative to  $GNP(p)$ . The expression in front of  $d^{<-1>}$ ,  $(a)$  determines if the debt-GNP ratio is stable. If this expression  $(a)$  is less than one then the debt-GNP ratio will converge to:

$$[3.9] \quad d = \frac{(g + h - t) (1 + y)}{y - i(1 - t)} = \frac{p}{(1-a)}$$

If  $a$  is greater than one, then for a given primary deficit  $(p)$ , the debt-GNP ratio  $(d)$  will continue to increase. If  $p$  is negative (a surplus) and  $(a)$  greater than one then  $(d)$  will also converge to  $d$ . For  $(a)$  equal to one, then stability requires  $p$  to be in balance.

#### 4.0 STABILITY OF THE DEBT-GNP RATIO

##### 4.1 The Historical Record

The ratio of debt to GNP was greater than 1.0 at the end of World War II, had dropped to 0.42 by 1955, and reached a low point of 0.17 in 1976. In the last several years the ratio has risen, reflecting the large deficit due to the major recession and high interest rates. But long-run stability is determined by the implicit coefficient of the lagged debt term ( $a$ ). Approximate values for the primary deficit ( $p$ ), the stability coefficient ( $a$ ), and the steady-state value of the debt-GNP ratio ( $d$ ), when appropriate, are shown in Table 4.1. In most years the process is stable ( $a$  less than 1.0). It is only since 1982 with the combination of high interest rates and slower GNP growth that the stability coefficient has exceeded one.

There is no evidence to suggest that a target debt-GNP ratio was implicit in the conduct of policy. In some years, the equilibrium rate was negative, implying a cumulated indebtedness of the private sector to government.

Table 4.1

Primary Deficit, Stability, and Steady-State Parameters  
for the Debt/GNP Ratio

<u>Year</u>	<u>Debt/GNP (d)</u>	<u>Primary Deficit/GNP (p)</u>	<u>Stability (a)</u>	<u>Steady-State (d)</u>
1955	0.424	-.007	0.932	-.108
1960	0.369	.003	0.994	.569
1965	0.301	-.016	0.944	-.281
1970	0.239	.006	0.989	.562
1975	0.177	.005	0.968	.160
1976	0.171	.004	0.941	.075
1977	0.185	.013	0.989	8.762
1978	0.205	.021	0.996	4.915
1979	0.206	.007	0.969	0.239
1980	0.213	.010	0.986	0.719
1981	0.220	.009	0.992	1.065
1982	0.265	.028	1.079	-
1983	0.306	.034	1.026	-
1984F	0.343	.029	1.028	-

#### 4.2 Why the concern?

There are two concerns being expressed. The first concern is about the inherent stability of the debt-GNP ratio, or will  $y > i(1-t')$ ?

With low inflation and slow growth in an environment of high nominal interest rates and poor collection of taxes on government interest payments because of avoidance or evasion then there is a problem. The obvious responses are to raise  $y$ , raise  $t'$ , and lower  $i$ . But if it is felt that governments cannot do this, then the focus switches to  $(g + h - t)$ , or more simply the primary deficit  $(p)$ . But it should be recognized that trying to reduce this deficit does not solve the stability problem. What it does is offset the growth in  $d$  that would occur by virtue of the coefficient on  $d^{-1}$  being greater than one. But continued

reductions in the primary deficit would be required to stabilize  $d$  until it was in surplus by an amount sufficient to offset the increase in  $d$  due to the interest payments.

The second concern is that, even if the process is stable or soon will be, the level at which  $d$  stabilizes is not satisfactory. The equilibrium level is:

$$d = \frac{(g + h - t)(1 + y)}{y - i(1 - t')} = p/(1 - a)$$

If the ratio ( $d$ ) is deemed to be too high then the level of the primary deficit ( $p$ ) must be lowered to determine another level, or the stability coefficient ( $a$ ) reduced. Minor, but permanent, changes in the primary deficit can have large effects on  $d$ , for a given  $a$ .

There are other concerns as well that surface in the discussion. Some people believe that government expenditure is too large. They are active participants in this debate if it serves their purpose. Others, perhaps an even larger group, want lower taxes ( $t$ ). But they are not comfortable with this whole debate.

The macroeconomist does (or should) recognize that the variables that enter these equations are not independent. In particular  $y$  (GNP growth) depends on the choices made on the primary deficits and interest rates. As well, interest payments

are a source of income in the economy; the issue may hinge on the relative propensities to consume of interest income recipients and those paying the taxes to support a reduction of the primary deficit.

#### 4.3 Income Distribution

Another implication of interest rates exceeding the growth of GNP is that the share of national income "earned" by wealth-holders rises, at the expense of wage earners, unincorporated income, and corporate income. There is nothing "magic" about any particular distribution, but there will be reactions to major shifts in before-tax or after-tax redistribution of incomes between sectors. These "frictions" may show up as increased inflation, which would increase GNP growth ( $y$ ), at least in nominal terms, and restore the "shares". But if interest rates adjust upward even more, or, equivalently, if real interest rates remain high, then such attempts are futile.

Thus, the mirror reflection of a rising debt-GNP ratio is a rising private asset-GNP ratio. Similarly a rising proportion of interest payments to GNP is reflected in a rising interest income to GNP share. The debate about stability of the debt-GNP ratio can be viewed as part of the on-going debate on shares of national income.

5.0 WHAT DOES THE FUTURE HOLD?

No one knows what will happen in the next twenty years. This uncertainty leads some to assume the worst and to urge immediate deficit reductions as a "prudent" course. But it could be argued that real interest rates will eventually decline and attempts to act "prudently" now will incur a substantial cost in lost output and higher unemployment in the short run without any lasting benefit in the longer run.

In Table 5.1 the debt-GNP ratio is shown for three scenarios - the Post II-84, the DEJA VU scenario, and the BLISS scenario. It is obvious that this ratio is sensitive to the underlying assumptions and performance of the economy! The assumptions behind these scenarios are detailed elsewhere,\* but the key parameters are provided in Table 5.2. In all cases a marginal tax rate of 25 per cent is assumed on interest payments accruing to the private sector.

\* Informetrica Limited, Post-Workshop II-84, Assumptions and Summary, 1985 and Pre-Workshop I-85, 1985.

Table 5.1

Federal Debt-GNP Ratio

	<u>Post II-84</u>	<u>DEJA VU</u>	<u>BLISS</u>	<u>PRE-BUDGET I-85</u>
1985	.381	.383	.368	.382
1990	.454	.503	.351	.500
1995	.481	.563	.335	-
2000	.457	.576	.267	-
2005	.423	.594	.183	-

Table 5.2

Selected Parameters for Different Scenarios  
(average for period, per cent)

	<u>Interest Rate (i)</u>	<u>Nominal GNP Growth (y)</u>	<u>Primary Deficit (p)</u>
<u>1986-90</u>			
Post II-84	11.03	7.12	1.04
BLISS	7.91	7.79	0.29
DEJA VU	14.15	8.01	1.39
Pre I-85	11.35	6.64	1.65
<u>1991-2005</u>			
Post II-84	8.32	6.93	.81
BLISS	6.58	7.01	-0.56
DEJA VU	11.36	8.44	0.56

With nominal interest rates substantially higher than nominal GNP growth and the continuation of a large primary deficit, the debt-GNP ratio rises in the DEJA VU scenario. But it is noteworthy that even in this case the ratio is less than 0.6 in 2005.

In the BLISS scenario with interest rates approximating nominal GNP growth and with a lower level of primary deficit, the ratio declines continuously. In fact, in the longer run with a

negative primary deficit (a primary surplus), the equilibrium ratio is  $-0.5$ , a substantial net asset position!

The Post II-84 reference scenario is clearly in between the other two scenarios, with an increase in the ratio through 1995 and a subsequent decline. Finally, the PRE-BUDGET I-85 update shows higher nominal interest rates, less GNP growth, and a larger primary deficit with the consequence that the debt-GNP ratio is  $0.50$  in 1990, as high as the DEJA VU scenario.



6.0 IS THERE A PROBLEM?

At this point a framework for discussing the deficit and debt-GNP ratio has been established. But there is still a question of whether the debt-GNP ratio is a matter of concern. Does a rising debt-GNP ratio cause anything to happen in the economy? If not, then it is only a curiosity or descriptive device.

Douglas Purvis\* in his paper for the National Economic Conference identifies five long-run costs of deficit finance. These are:

- (1) The burden of the debt,
- (2) foreign indebtedness,
- (3) inflation,
- (4) tax distortions,
- (5) Straight-jacket for stabilization policy.

Let's examine each of these areas in turn and try to identify the link to a fiscal deficit and the cost.

\* Douglas D. Purvis, "Managing the Deficit", National Economic Conference (1985, Ottawa)

## 6.1 The Burden of the Debt

The mechanism is the public debt holdings in the private sector substitute for private debt holdings which would have been used for investment in productive capital. This creates a burden by reducing the capital stock inherited by the next generation. But is this true? Under what circumstances is "crowding-out" likely to occur? And would a move to fiscal restraint lead to a smaller burden?

In an economy with fully-employed resources a decision by governments to use resources for an expenditure will require a reduction of expenditures in another part of the economy (consumption, investment, net exports). Thus there is crowding-out. How and where it occurs will depend on the mechanism used for financing the additional expenditure. A tax increase on the personal sector is likely to reduce consumption, a similar increase in taxation on the business sector is likely to reduce investment. If the financing is by debt creation, then higher interest rates are likely to be the result with some reduction of consumption, investment, and net exports if the exchange rate appreciates. Financing by money creation is likely to "crowd-out" private expenditures by reducing real incomes through more inflation as the required resources are "bid away" from the private sector.

But even in this case it is not clear that the capital stock inherited by the next generation is diminished. The expenditure by government could be on infrastructure, basic

research, human capital development, or any number of areas in which the result may be of greater benefit than that forgone by crowding-out the private expenditure.

In an economy with idle resources or underutilized resources, the Canadian situation since 1973, a decision to increase expenditure directly or through tax reductions and to finance the deficit through an increase in debt or money is likely to be of benefit to future generations (and the current generation) since there is no need for the crowding-out of private expenditure. More likely is a response of the private sector that improved demand will increase the physical capital stock through investment and improve the human capital stock through employment, training, and further education. If in a slack economy, the government moves to restraint, then it increases the dead loss of idle resources and decreases the income base for financing the on-going investment. This reduces the present and future capital stock.

## 6.2 Foreign Indebtedness

It is generally agreed that interest payments by government to its own citizens are not a burden, representing a redistribution of income within the country. But if a budgetary deficit causes a current account deficit then increased foreign borrowing leads to a transfer of claims on real resources in Canada. Another way of triggering such a response is to consider the case of the government borrowing abroad directly, leading to an exchange rate appreciation which increases the current account

deficit to accommodate the increased foreign borrowing. The cost in this case is the additional resources required to service the external debt.

But this cost is only incurred if, in fact, there is an increase in net foreign borrowing, or, equivalently, a deterioration of the current account balance. But an increase in the deficit resulting from an export promotion or import substitution program could lead to less of this type of burden. The ability to change exports or imports depends on the state of the economy. If resources are fully employed then the "crowding-out" may occur in international trade. If resources are idle, the stimulus may lead to increased imports and, hence, more borrowing abroad, but not necessarily or usually by the full amount of the stimulus. In the worst case, with complete financing abroad of the deficit it is still not clear if there is a net burden. If the resources now employed in the economy earn a return in excess of the cost of borrowing abroad then the country is better off.

### 6.3 Inflation

The concern is that persistent deficits and large debt-GNP ratios lead to inflation. The mechanism is that governments are pressured to monetize the debt, leading to expansionary monetary policy and, eventually, to increased inflation.

But this is contrary to our history. Persistent deficits and high debt-GNP ratios in the 1930s and 1940s did not lead to inflation. In the first half of the 1970s with falling debt-GNP ratios and surpluses inflation accelerated. More recently we have observed persistent deficits and rising debt-GNP ratios and a slowing of inflation. This is not to suggest that governments cannot cause inflation to accelerate by monetary creation. But any fixed linkage to deficits or the debt-GNP ratio is dubious.

A choice to stimulate in an economy with fully utilized resources is, of course, not usually appropriate. In such circumstances the prudent course would be to apply fiscal restraint. But that is not the situation in Canada today!

#### 6.4 Tax Distortions

Another argument against deficit finance is that additional tax revenues to service the debt are not costless. There are administrative costs and distorting effects of taxes on economic efficiency and incentives.

But if additional government expenditures were not debt-financed they must presumably be tax-financed. These tax costs would be even higher since the amount of tax would be the full amount of the expenditures, not just servicing costs.

### 6.5 Adverse Effect on Stabilization Policy

The cost of a large debt-GNP ratio is that room for action to stabilize the economy is reduced. As well governments become more vulnerable to interest rate fluctuations.

But in an economy with idle resources it is clear that the stabilization role is not being fulfilled. To argue that we need to be more restrictive today in order to have some room at some future point in time is a severe form of flagellation. This "rainy day" guideline is not appropriate when the economy is already operating substantially below its potential.

It is true that governments with large debt-GNP ratios are more sensitive to interest rate fluctuations, particularly if the debt is financed on a short-term basis. But it is a two-edged sword; the improvement to the fiscal position with lower interest rates can be quite dramatic. Nor is it necessarily bad that governments be more sensitive to interest rate fluctuations. Perhaps the conduct of monetary policy will be improved if not only the private sector is affected by sudden jumps in interest rates!

### 6.6 What are the problems?

It is hard to believe that so much attention is focused on the issue of the deficit and the debt-GNP ratio if there is not a problem. It is not likely that so many people can be wrong; or is it? There are, in my view, several problems for which the deficit becomes the focal point.

The first problem is that there is a lack of confidence that we can manage our economic affairs to achieve the full potential of the Canadian economy. Large deficits don't seem to help, even though most recognize that the deficits are a result of the slack economy, and not the other way around.

The second problem is the persistence of high nominal interest rates and increasingly high real interest rates. We know that this alone increases deficits and debt-GNP ratios and entails a redistribution of income from spenders to savers with adverse macroeconomic consequences. Nor do we seem able to pick a different path because of a fear that the exchange rate will depreciate too much and perhaps trigger a resurgence of accelerating inflation. The economy is thought to be too inflexible to adjust to such an external shock.

The third problem is that there is not a national consensus on the size and role of government. Some are concerned that the potential of the economy is lowered by pro-active role of government. Others feel that government can enhance the potential through greater involvement. Those who want less government find it convenient to rail against the deficit. Those who want more government demand assistance for their project, even if the benefit received is saved or substitutes for a private expenditure.

6.7 Is there an answer?

The answer is not likely to be found unless we can first agree on the real problems and the objectives for the economy that we collectively want. If the problems identified above are the correct ones, then an answer to them is to be found in:

- (1) Setting monetary policy such that real interest rates are maintained at a stable, low rate consistent with the growth in the potential of the economy (2-4 per cent).
- (2) Pursuing fiscal policy with a major focus on creating effective demand consistent with the full utilization of labour and capital.
- (3) Continue to seek a consensus on the role and size of government.
- (4) Improve the flexibility and resiliency of the Canadian economy through structural policies to improve competition, enhance mobility, and speed adjustment processes.

If public attention and the thrust of fiscal policy is focused on deficit reduction then the result will be higher unemployment, lower capacity utilization and an increasing lack of confidence in our abilities to manage our affairs.