



INTERNET CHAPTER THREE

Deficit Finance

In British North America, debt had been incurred almost exclusively for great public works such as canals, harbours, ship channels, and railways; and in 1866, debt charges amounted to 28.9 per cent of total current expenditures.

—Donald Creighton (1939: 78)

In addition to the major taxes used by federal, provincial, and local governments, another major source of government finance is borrowing. The issue of debt finance has been prominent in discussions of economic policy; it is constantly debated in political campaigns and on editorial pages. This chapter discusses problems in measuring the size of the debt, who bears its burden, and the circumstances under which debt is a suitable way to finance government expenditures.

THE SIZE OF THE DEBT

Some definitions are needed to begin our discussion. The deficit during a time period is the excess of spending over revenues. A proper measure of the extent of government borrowing requires that all revenues and expenditures be taken into account. Table IC3.1 shows total federal and provincial deficits (and more recently, surpluses) from 1966 to 2001. The table also shows that provincial governments have contributed significantly, particularly in the past two decades, to total public sector deficits. To put these figures in perspective, we also show their size relative to gross domestic product.

Table IC3.1 reflects a general trend for deficits to increase both in dollar value and as a proportion of GDP from the 1970s into the late 1990s. Governments in Canada were spending considerably more than they were taking in. From 1969 through 1997, the federal government neither balanced its budget nor ran even a modest surplus. From 1966 to 1997, there was never a year when consolidated (federal + provincial + local) government revenues exceeded expenditures.

One must distinguish between the concept of deficits and debt. The debt at a given time is the sum of all past budget deficits. That is, the debt is the cumulative excess of past spending over past receipts. In the jargon of economics, the debt is a “stock variable” (measured *at* a point in time), while the deficit is a “flow variable” (measured *during* a period of time). As reported in official government statistics, the net federal debt on March 31, 2000, was \$565 billion (Table IC3.2). Let us try to put government debt—well over half a “trillion” dollars for the federal government, and over \$800 billion when combined with provincial net debt—

TABLE IC3.1**Federal and Provincial Deficits, Selected Fiscal Years 1966 to 2001**

Fiscal Year	FEDERAL GOVERNMENT		PROVINCIAL GOVERNMENT		COMBINED
	Deficit (billions)	Percent of GDP	Deficit (billions)	Percent of GDP	Percent of GDP
1966	\$ (0.2)	(0.3)	\$ 0.2	0.3	0.0
1970	(0.4)	(0.4)	(<0.1)	(0.1)	0.5
1980	11.6	3.7	0.1	0.0	3.7
1985	37.0	7.6	6.7	1.4	9.0
1990	28.0	4.1	2.0	0.3	4.4
1995	36.7	4.8	14.7	1.9	6.7
1996	33.2	4.1	9.7	1.2	5.3
1997	13.5	1.6	5.9	0.7	2.3
1998	(4.5)	(0.5)	2.3	0.2	(0.3)
1999	(2.6)	(0.3)	12.0	1.3	1.0
2000	(6.7)	(0.7)	(1.4)	(0.1)	(0.8)
2001	(9.1)	(0.9)	(11.5)	(1.1)	(2.0)

Source: Statistics Canada, *Public Sector Finance, 1995/96*, Cat. No. 68-212-XPB (Ottawa: March 1996), p. 5, and *Public Sector Statistics 2000–2001*, Cat. No. 68-213-XIB (Ottawa, November 2001), pp. 60 and 64.

in perspective, again by comparing it with GDP. The 2000 federal debt of \$565 billion was over 50 percent of that year's GDP—54 cents of every dollar produced in that year would have been required to liquidate the debt. If we include provincial debt, about 80 cents of every dollar would have been required. This is an improvement since 1996, when nearly a full year's GDP would have been required to liquidate federal plus provincial debt. Federal and provincial debt grew rapidly from 1969 to 1997, and has since declined slightly. Federal net debt fell from 69 percent of GDP in 1996 to 43.5 percent by 2000.

Public debt also grew rapidly in *per capita* terms until the late 1990s. Per capita federal debt, which was \$1,500 in 1977, had risen to \$19,600 by 1997. Including provincial debt, per

TABLE IC3.2**Federal and Provincial Net Debt—Total, Per Capita, and as a Percent of GDP**

Fiscal Year	FEDERAL			PROVINCIAL			FEDERAL AND PROVINCIAL		
	Debt (billions)	Per Capita	% of GDP	Debt (billions)	Per Capita	% of GDP	Debt (billions)	Per Capita	% of GDP
1977	\$ 35	\$ 1,505	17.7	\$ 9	\$ 371	4.3	\$ 44	\$ 1,876	22.0
1980	72	2,987	25.8	11	438	3.8	83	3,425	29.6
1985	204	7,898	45.3	35	1,382	7.9	240	9,280	53.1
1995	551	18,760	67.8	224	7,632	27.6	775	26,392	95.4
1996	579	19,504	69.0	236	7,950	28.1	815	26,454	97.1
1997	588	19,622	66.5	242	8,062	27.3	830	27,684	93.8
1998	582	19,239	63.5	245	8,107	26.8	827	27,346	90.3
1999	578	18,962	59.3	258	8,468	26.5	837	27,330	85.8
2000	565	18,355	53.5	257	8,352	24.3	822	26,707	77.8

Source: Statistics Canada, *Public Sector Finance, 1995/96*, Cat. No. 68-212-XPB (Ottawa: March 1996), pp. 1 and 4, and *Public Sector Statistics, 2000–2001*, Cat. No. 68-213-XIB (Ottawa: November 2001), pp. 61 and 65.



capita public debt in Canada peaked at \$27,700 in 1997. These two figures were reduced to \$18,400 and \$26,700 by 2000. The latter figure is still over \$100,000 for a family of four.

Years of chronic deficits from 1970 through 1997 led to increasing ratios of debt to GDP. This ratio decreased from 1998 to 2001 as the federal surplus grew from \$4.5 billion to \$9.1 billion. The federal surpluses that began in fiscal 1998 were in large part due to significant cutbacks in program spending. Federal program spending decreased from \$132 billion in 1993 to \$117 billion in 1998 while revenues rose from \$135 billion to \$165 billion due to economic growth and limited indexing for inflation. The Liberal government and Finance Minister Paul Martin focused on achieving a balanced budget and a reduction in the debt to GDP ratio. However, with an economic recession beginning in 2001, a federal deficit may again occur in fiscal 2003.

Provincial governments, whether NDP (Saskatchewan), PC (Alberta and Ontario), or Liberal (New Brunswick), also acted to bring expenditures more in line with revenues, and by the year 2000, provinces were experiencing a slight surplus. Note, however, that the deficit and net debt position varied greatly from province to province. Table IC3.3 shows the per capita net debt and deficits for the 10 provinces. Per capita provincial net debt in 1999 ranged from \$133 in Alberta to over \$12,400 in Quebec and over \$15,000 in Newfoundland.

Just like a private borrower, the government must pay interest to its lenders. As federal and provincial debts grew rapidly, so did interest payments. By fiscal 1996, interest payments were \$47 billion, or 27 percent of all federal expenditures (Table IC3.4). In the same year, provincial government interest on debt was 14 percent of every dollar of provincial expenditure. For provincial and federal governments combined, by 1995 over 20 cents of every dollar went to service the debt, reducing available funds for other expenditure programs. Interest on debt was one of the fastest growing components of federal spending over the 25 years from 1970 to 1995. Concern about adverse effects of such debt levels and service charges on the long-term growth of Canadian economy resulted in a shift to modest surpluses by the end of the century.

TABLE IC3.3**Provincial Net Debt by Province—Total and Per Capita, 1999**

Province	Provincial Net Debt (billions)	Per Capita Net Debt
Newfoundland	\$ 8.015	\$15,049
Prince Edward Island	1.003	7,304
Nova Scotia	9.158	9,771
New Brunswick	5.546	7,358
Quebec	91.148	12,416
Ontario	108.761	9,485
Manitoba	9.112	7,988
Saskatchewan	10.017	9,763
Alberta	0.391	133
British Columbia	15.162	3,773
Canada (above combined)	\$258.271	\$ 8,494

Source: Statistics Canada, *Public Sector Statistics, 2000–2001*, Cat. No. 68-213-XIB (Ottawa, November 2001), pp. 66–67.

TABLE IC3.4**Debt Service Charges on Public Debt as a Share of Government Expenditures, Selected Years from Fiscal 1966 to Fiscal 2000**

Fiscal Year	Federal Government (percent)	Provincial Government (percent)	Federal and Provincial Governments (percent)
1966	12.5	4.3	9.0
1970	11.9	5.4	8.8
1975	10.6	6.5	8.6
1980	15.0	7.8	11.4
1985	19.5	11.5	15.8
1990	26.8	12.1	19.5
1995	26.6	14.2	20.1
1996	27.1	14.2	20.2
1997	27.0	14.0	20.0
1998	26.5	13.9	19.6
1999	25.5	13.8	19.1
2000	24.8	13.5	18.7

Source: Statistics Canada, *Public Finance Historical Data, 1965/66–1991/92*, Cat. No. 68-512 (Ottawa, March 1992), and *Public Sector Statistics, 2000–2001*, Cat. No. 68-213-XIB (Ottawa: November 2001), p. 60, and *Canadian Economic Observer: Historical Statistical Supplement 2000/01*, Cat. No. 11-210-XPB (Ottawa: Ministry of Industry, July 2001), p. 17.

Interpreting Deficit and Debt Numbers

Numbers of the sort reported in Tables IC3.1, IC3.2, and IC3.3 often find their way into discussions of government fiscal policy. Nevertheless, for a variety of reasons, the official deficit and debt figures may not be economically meaningful. In this section we describe some of their problems.

Government debt held by the Bank of Canada and government agencies. In the course of conducting its monetary operations, the Bank of Canada purchases federal government securities. Its holdings at the end of 2000 were \$37.1 billion (Department of Finance, *Debt Management Report, 2000–2001* (Ottawa, 2001) p. 58). Other government agencies and levels of government held an additional \$28 billion in federal government securities. It would seem that the amount of debt held by nongovernmental agencies is more relevant for most purposes.

Provincial and local government debt. Although we often think of debt as a “problem” of the federal government, provincial debts are also sizable. Provincial debt exceeded \$257 billion in 2000, about a third the size of the federal debt. Local government net debt was \$16 billion in 1999 (Statistics Canada, *Public Sector Statistics, 2000–2001*, p. 73). Provincial government debt increased sevenfold from 1985 to 1998, while federal government debt increased less than threefold. As previously noted, provincial governments of various political persuasions in the mid-1990s have focused on closing the gap between revenues and expenditures. The sum of total government debt is relevant if we wish to assess the pressure that government as a whole has exerted on credit markets.

Effects of inflation. In standard calculations of the deficit, taxes are viewed as the only source of government revenue. However, when the government is a debtor and the price level



changes, changes in the real value of the debt may be an important source of revenue. To see why, suppose that at the beginning of the year you owe a creditor \$1,000 and the sum does not have to be repaid until the end of the year. Suppose, further, that over the course of the year prices rise by 10 percent. Then the dollars you use to repay your creditor are worth 10 percent less than those you borrowed. In effect, inflation has reduced the real value of your debt by \$100 (10 percent of \$1,000). Alternatively, your real income has increased by \$100 as a consequence of inflation. Of course, at the same time, your creditor's real income has fallen by \$100.¹

Let us apply this logic to an analysis of the federal surplus for the 2001 fiscal year. At the end of that year the federal government's outstanding debt was about \$565 billion. During 2000 the rate of inflation was over 2 percent. Hence, inflation reduced the real value of the federal debt by \$11.3 billion ($= \$565 \text{ billion} \times 0.02$). In effect, this is as much a receipt for the government as any conventional tax. If we take this "inflation tax" into account, the conventionally measured surplus of \$9.1 billion is increased to \$20.4 billion, a considerably larger figure. However, the government's accounting procedures do not allow the inclusion of gains due to inflationary erosion of the debt. This induces a tendency to overestimate the size of a deficit and underestimate the size of a surplus.

Capital versus current accounting. The federal government lumps together all expenditures that are legally required to be included in the budget. There is no distinction between *current spending* and *capital spending*. Current spending refers to expenditures for services that are consumed within the year—upkeep at the Parliament buildings or salaries for Canadian peace-keepers, for example. Capital spending, in contrast, refers to expenditures for durable items that yield services over a long time, such as radar stations, highways, military aircraft, and airports.

In contrast to federal government practice, the standard accounting procedure for corporations, and to varying degrees for local and provincial governments, is to keep separate budgets for current and capital expenditure. Maintaining a separate capital budget can provide a more accurate picture of an organization's financial status. Why? Purchase of a durable does not generally represent a "loss." It is only the trade of one asset (money) for another (the durable). Hence, acquisition of the asset does not contribute to an organization's deficit. Of course, as the capital asset is used, it wears out (depreciation), and this *does* constitute a loss. Thus, standard accounting procedures require that only the annual depreciation of durable assets be included in the current budget, not their entire purchase price. If the federal government used capital budgeting, the conventionally measured deficit would fall very substantially.²

The idea of the federal government adopting capital budgeting is controversial. Proponents of capital budgeting note that its absence leads to some bizarre governmental decisions. In particular, one strategy for reducing the government deficit is to sell off government assets, such as airports or hospitals, to the private sector. As we pointed out in Chapter 4, there may be good reasons for transferring such assets to private individuals, but such transactions have nothing to do with reducing the real budget deficit. They simply

1 If the inflation is anticipated by borrowers and lenders, one expects the interest rate charged to be increased to take inflation into account. This phenomenon was discussed in Chapter 18.

2 Eisner's (1986) estimates for the U.S. federal government are that the government deficit would be cut by a third to a half if the federal government used capital budgeting. The effect would be significant in Canada as well, increasing the size of the surplus in recent years.

represent the government trading one asset for the other.³ However, under the current accounting system, the proceeds of such sales may be treated as equivalent to tax revenues, and so count toward reducing the deficit.

Opponents of capital budgeting point out that, for governments, it is particularly difficult to distinguish between current and capital expenditure. Are educational and job-training programs a current expense, or an investment in human capital that will yield future returns? Is a missile, for example, an investment (because it will last a long time), or a current expenditure (because it is not re-usable)? Such ambiguities could lead to political mischief, because every proponent of a new spending program could claim it was an investment and therefore belonged in the capital budget where it would not contribute to a higher deficit.

Tangible assets. Suppose that a family owns tangible assets (yachts, houses, Rembrandts) worth \$15 million, owes the local bank \$25,000 for credit card charges, and has no other assets or liabilities. It would be pretty silly to characterize the family's overall position as being \$25,000 in debt. All assets and liabilities must be considered to assess the overall financial position.

The federal and provincial governments have not only massive financial liabilities, but vast tangible assets as well. These include residential and nonresidential buildings, equipment, gold, land, and natural resources. However, public discussion has focused almost entirely on the government's financial liabilities, and not its tangible assets. Some have argued that the omission of tangibles leads to a highly misleading picture of the government's financial position.⁴

Contingent liabilities. Federal and provincial governments provide loan guarantees to private enterprise and stand behind loans made to crown corporations. These are debts for which governments may not be directly responsible, but for which they would become responsible if the private enterprise or the crown corporation were unable to pay. As of March 31, 1999, the total contingent liabilities of the federal government were \$76.9 billion (\$41.4 billion for crown corporations).⁵ Contingent liabilities of provinces exceeded \$89 billion on March 31, 1999.

Implicit obligations. One way to think of a bond is simply as a promise to make certain payments of money in the future. The present value of these payments is the amount by which the bond contributes to the debt. But bonds are not the only method that the federal government uses to promise money in the future. It can do so by legislation. The most important example is the Canada Pension Plan, which promises benefits to future retirees that must be paid out of future tax revenues.⁶ The precise value is hard to estimate, and

³ Included in Alberta's 2001–02 provincial revenue was \$6 billion in payments made by resource companies for royalties and for leases on crown lands. This accounted for about 30 percent of the province's operating revenues. The government is trading one asset for another when it sells the right to its resources. With the \$6 billion included in operating revenues the budget is balanced. Treating the \$6 billion as the conversion of one form of capital asset (oil and gas) to another form of capital asset (cash) would turn the balanced budget into a \$6 billion deficit. See Smith (1992).

⁴ Where government spending is for additional capital assets, the operating deficit, by not reflecting the increase in the asset base, may be overstated. Where receipts from the sale of rights to nonrenewable resources such as oil, gas, and other minerals are included in government operating revenues, the government's capital stock may be reduced and the operating deficit may be understated.

⁵ See Treff and Perry (2001: 16.7).

⁶ For further discussion along these lines, see Auerbach, Gokhale, and Kotlikoff (1991).

legislation does not require the Canada Pension Plan account to be determined on an actuarial basis. Nonetheless, the federal government sends statements to Canadians specifying the monthly income they can anticipate receiving from the Canada Pension Plan at age 65.⁷ In addition, legislation promises retirement benefits to civilian and military employees. The value of these obligations is many billions of dollars for both federal and provincial governments. If implicit obligations are taken into consideration, the federal and provincial debt is much larger than the official figure.

Of course, legislative promises and official debt are not exactly equivalent. Their legal status is quite different; explicit forms of debt represent legal commitments, while Canada and Quebec Pension Plan payments can be reduced by legislative action, at least in principle. Nevertheless, political support for the Canada and Quebec Pension Plans, and for other pension programs for public servants, is strong, and it would be surprising to see the government renege on these promises.

Summing Up

How big is the national debt? The answer depends on which assets and liabilities are included in the calculation, and how they are valued. As in other similar situations, the “correct” answer depends on your purposes. For example, if the goal is to obtain some sense of all the obligations that have to be met by future taxpayers, then measures including implicit obligations such as the Canada Pension Plan might be appropriate. But if the purpose is to assess the effect of debt policy on credit markets (discussed later), then a more conventional measure including only official liabilities might be more useful. Our discussion certainly shows that considerable caution must be exercised in interpreting figures on debts and deficits.

THE BURDEN OF THE DEBT

The effects of government debt may not be that obvious to many — even if Canada’s Finance Minister has made debt reduction a major objective. So how has the national and provincial debt affected your life, personally? It’s a tough question, and answering it requires one to think hard about the costs of debt finance and who bears them.

We begin by noting that future generations either have to retire the debt, or else refinance it. (Refinancing simply means borrowing new money to pay existing creditors.) In either case, there is a transfer from future taxpayers to bondholders because even if the debt is refinanced interest payments must be made to the new bondholders. It would appear, then, that future generations must bear the burden of the debt. But those who are familiar with the theory of incidence (Chapter 15) should be suspicious of this line of reasoning. Merely because the legal burden is on future generations does not mean that they bear a real burden. Just as in the case of tax incidence, the chain of events set in motion when borrowing occurs can make the economic incidence quite different from the statutory incidence. Just as with other incidence problems, the answer depends on the assumptions made about economic behaviour.

⁷ Boyle and Murray (1979: 462) estimated that the present value of anticipated benefits from the Canada and Quebec Pension Plans, net of anticipated contributions to the plans, was \$82 billion in 1975. Official federal debt in that same year was about \$25 billion. Thus, the “implicit obligation” of the CPP in 1975 was several times the size of the official debt.

Lerner's View

Assume the government borrows from its own citizens—the obligation is an **internal debt**. According to Lerner (1948), an internal debt creates no burden for the future generation. Members of the future generation simply owe it to each other. When the debt is paid off, there is a transfer of income from one group of citizens (those who do not hold bonds) to another (bondholders). However, the future generation as a whole is no worse off in the sense that its consumption level is the same as it would have been. As an eighteenth-century writer named Melon put it, the “right hand owes to the left” (Musgrave, 1985: 49).

The story is quite different when a country borrows from abroad to finance current expenditure. This is referred to as an **external debt**. Less than 17 percent (\$96 billion) of the Canadian federal debt and 55 percent of provincial debt (\$139 billion) was held by foreign investors in 2000 (Statistics Canada, *Canada's International Investment Position, 2000*, p. 68). Suppose that the money borrowed from overseas is used to finance current consumption. In this case, the future generation certainly bears a burden, because its consumption level is reduced by an amount equal to the loan plus the accrued interest that must be sent to the foreign lender.⁸ If, on the other hand, the loan is used to finance capital accumulation, the outcome depends on the project’s productivity. If the marginal return on the investment is greater than the marginal cost of funds obtained abroad, the combination of the debt and capital expenditure actually makes the future generation better off. To the extent that the project’s return is less than the marginal cost, the future generation is worse off.

The view that an internally held debt does not burden future generations dominated the economics profession in the 1940s and 1950s. There is now widespread belief that things are considerably more complicated.

An Overlapping Generations Model

In Lerner’s model, a “generation” consists of everyone who is alive at a given time. Perhaps a more sensible way to define a generation is everyone who was born at about the same time. Using this definition, at any given time several generations coexist simultaneously, a phenomenon that is taken into account in an **overlapping generations model**. Analysis of a simple overlapping generations model shows how the burden of a debt can be transferred across generations.

Assume that the population consists of equal numbers of young, middle-aged, and old people. Each generation lasts twenty years, and each person has a fixed income of \$12,000 over the twenty-year period. There is no private saving—everyone consumes their entire income. This situation is expected to continue forever. Income levels for three representative people for the period 2002 to 2022 are depicted in line 1 of Table IC3.5.

Now assume that the government decides to borrow \$12,000 to finance public consumption. The loan is to be repaid in the year 2015. Only the young and the middle-aged are willing to lend to the government—the old are unwilling because they will not be around in twenty years to obtain repayment. Assume that half the lending is done by the young and half by the middle-aged, so that consumption of each person is reduced by \$6,000 during the period 2002 to 2022. This fact is recorded in line 2 of Table IC3.5.

⁸ If the loan is refinanced, only the interest must be paid.

TABLE IC3.5**Overlapping Generations Model for the Period 2002 to 2022**

THE YEAR 2002			
	Young	Middle-aged	Old
(1) Income	\$12,000	\$12,000	\$12,000
(2) Government borrowing	-6,000	-6,000	
(3) Government-provided consumption	4,000	4,000	4,000
			THE YEAR 2022
	Young	Middle-aged	Old
(4) Government raises taxes to pay back the debt	\$-4,000	\$-4,000	\$-4,000
(5) Government pays back the debt		+6,000	+6,000

However, with the money obtained from the loan, the government provides an equal amount of consumption for all—each person receives \$4,000. This is noted in line 3.

Time passes, and the year 2022 arrives. The generation that was old in 2002 has departed from the scene. The formerly middle-aged are now old, the young are now middle-aged, and a new young generation has been born. The government has to raise \$12,000 to pay off the debt. It does so by levying a tax of \$4,000 on each person. This is recorded in line 4. With the tax receipts in hand, the government can pay back its debt holders, the now middle-aged and old (line 5). (It is assumed for simplicity that the rate of interest is zero, so all the government has to pay back is the principal. Introducing a positive rate of interest would not change the substantive result.)⁹

The following results now emerge from Table IC3.5:

- As a consequence of the debt and accompanying tax policies, the generation that was old in 2002 to 2022 has a lifetime consumption level \$4,000 higher than it otherwise would have had.
- Those who were young and middle-aged in 2002 to 2022 are no better or worse off from the point of view of lifetime consumption.
- The young generation in 2022 has a lifetime consumption stream that is \$4,000 lower than it would have been in the absence of the debt and accompanying fiscal policies.

In effect, \$4,000 has been transferred from the young of 2022 to the old of 2002. To be sure, the debt repayment in 2022 involves a transfer between people who are alive at the time, but the young are at the short end of the transfer because they have to contribute to repaying a debt from which they never benefited. Note also that the internal-external distinction that

⁹ The assumption of a zero interest rate also means there is no need to discount future consumption to find its present value.

was key in Lerner's model is of no relevance here; even though the debt is all internal, it creates a burden for the future generation.

The model in Table IC3.5 suggests a natural framework for comparing across generations the burdens (and benefits) of government fiscal policies. This framework, called **generational accounting** by Auerbach, Gokhale, and Kotlikoff (1991), involves the following steps. First, take a representative person in each generation and compute the present value of all taxes he or she pays to the government. Next, compute the present value of all transfers received from the government, including Canada Pension Plan benefits, health care benefits, and so on. The difference between the present value of the taxes and the transfers is the “net tax” paid by a member of that generation. By comparing the net taxes paid by different generations, one can get a sense of how government policy redistributes income across generations.

Most calculations using this framework suggest that older generations benefit at the expense of younger generations. For example, benefits to those first qualifying for full payments under the Canada Pension Plan far exceeded the contributions they had made to the plan over their working lives. The costs were covered by taxes from those in the work force. Calculations of such costs to younger generations rest heavily on assumptions about future tax rates, interest rates, and so on.¹⁰ Further, they do not allow for the possibility that individuals in a given generation may care about their descendants as well as themselves (see below). Thus, the main contribution of the generational accounts framework is to focus our attention on the lifetime (rather than annual) consequences of government fiscal policies. Like conventional deficit figures, the specific net taxes must be taken with a grain of salt.

The Neoclassical Model of Deficit Finance in a Closed Economy

The intergenerational models discussed so far do not allow for the fact that economic decisions can be affected by government debt policy, and changes in these decisions have consequences for who bears the burden of the debt. Instead, it has been assumed that the taxes levied to pay off the debt affect neither work nor savings behaviour when they are imposed. If taxes distort these decisions, real costs are imposed on the economy.

More importantly, we have ignored the potentially important effect that debt finance can have on capital formation in a closed economy—an economy that can neither borrow from, nor lend to, foreigners. The neoclassical model of debt financing in a closed economy stresses that when the government initiates a project, whether financed by taxes or borrowing, resources are removed from the private sector. One usually assumes that when tax finance is used, most of the resources removed come at the expense of consumption. On the other hand, when the government borrows, it competes for funds with individuals and firms who want the money for their own investment projects. Hence, it is generally assumed that debt has most of its effect on private investment. To the extent that these assumptions are correct, debt finance leaves the future generation with a smaller capital stock, *ceteris paribus*. Its members therefore are less productive and have smaller real incomes than otherwise would have been the case. Thus, even in Lerner's model, the debt

¹⁰ One set of estimates for the United States (Bradsher, 1994: A17) found that the “net tax” rate as a percent of life-time income for teenagers of the 1990s will be 39.6 percent, while it was 33.2 percent for people born in 1950 and 23.6 percent for those born in 1900. Given trends in social programs and taxes in the industrial world, similar differences are likely to be found in Canada and other countries.



can have a burden. The mechanism through which it works is the reduction of capital formation. (Note, however, that one of the things that is held equal here is the public sector capital stock. As suggested earlier, to the extent that the public sector undertakes productive investment with the resources it extracts from the private sector, the total capital stock increases.)

The assumption that government borrowing reduces private investment plays a key role in the neoclassical analysis. It is sometimes referred to as the **crowding out hypothesis**—when the public sector draws on the pool of resources available for investment, private investment is crowded out. Crowding out is induced by changes in the interest rate. When the government increases its demand for credit, the interest rate, which is just the price of credit, must go up. But if the interest rate goes up, private investment becomes more expensive and less of it is undertaken.

Expressed this way, it would appear relatively straightforward to test the crowding out hypothesis. Just examine the historical relationship between the interest rate and government deficits (as a proportion of gross national product). If the correlation between the two variables is positive, this tends to support the crowding out hypothesis, and vice versa.

Unfortunately, things are complicated by the fact that other variables can also affect interest rates. For example, during a recession, investment decreases and hence the interest rate falls. At the same time, slack business conditions lead to smaller tax collections, which increases the deficit, *ceteris paribus*. Hence, the data may show an inverse relationship between interest rates and deficits, although this says nothing one way or the other about crowding out. As usual, the problem is to sort out the *independent* effect of deficits on interest rates. When Miller and Roberds (1992) reviewed the econometric studies of U.S. evidence on this issue, they found conflicting results.

Despite the murkiness of the econometric evidence, the theoretical case for at least some crowding out in a closed economy is so strong that most economists agree that large deficits cause some reduction in the capital stock. However, the precise size of this reduction, and hence the reduction in welfare for future generations, is not known with any precision. There is also reason to believe that crowding out is less likely to be important in an open economy such as Canada's.

Deficit Finance in an Open Economy

Canada is often referred to as a “small open economy,” into and out of which capital easily flows. The return on capital in a small open economy is determined by the global supply and demand for capital; thus, an increase in demand for capital in a small open economy due to government deficits has little effect on global demand and little or no effect on interest rates. Any upward pressure on interest rates causes funds to flow in from abroad, and crowding out of private investment in such a case is minimal. But the inflow of funds from abroad does have an effect. The increase in the demand for dollars causes the Canadian dollar to appreciate and increases the relative price of Canadian exports. Hence, net exports are crowded out rather than domestic investment. In Canada, exports are likely to absorb a significant part of the crowding out. Nonetheless, there is a short-run increase in resources available to Canadians because foreigners willingly lend to Canada at the global interest rate. This is, however, accompanied by an expectation of repayment.

In addition to crowding out exports, deficits have other effects in an open economy situation. First, increasing debt servicing costs is likely to necessitate higher tax rates in the future if the debt has not contributed to increased productive capacity. And an expecta-

tion of higher taxes may well dampen business investment, even where crowding out of private investment has not occurred. Second, government deficits have been financed, in part, by an increase in foreign purchases of Canadian assets, including government securities. Over a quarter (\$235 billion) of combined federal and provincial debt was held by foreigners in 2000, and Canada's overall net indebtedness to foreigners was \$244 billion. The debt must be serviced and/or repaid. Although costs to future generations due to crowding out of private investment may be minimal, the burden may still be substantial because of consumption that must be forgone in the future in order to make interest payments to foreigners.

It is well to keep in mind that no advanced economy is either totally “closed” or totally “open.” While crowding out of private investment may be much less likely in Canada than in a large country such as the United States, the possible effects still require analysis in Canada.

As a small open economy with a significant share of government and private debt held by nonresidents, Canada must attend to the views of international investors. If nonresidents lose confidence in Canada's ability to service and repay its debt, and to protect the value of the Canadian dollar, future borrowing may be possible only at much higher interest rates. Loss of confidence could also lead to large sales of Canadian securities and the Canadian dollar, sharply increasing the cost of imports as well as the cost of borrowing.

Ricardian Model

Our discussion so far has ignored the potential importance of individuals' intentional transfers across generations. Barro (1974) has argued that when the government borrows, members of the “old” generation realize that their heirs will be made worse off. Suppose further that the old care about the welfare of their descendants and therefore do not want their descendants' consumption levels reduced. What can the old do about this? One possibility is simply to increase their bequests by an amount sufficient to pay the extra taxes that will be due in the future—whether the tax revenues are used to repay Canadians or foreign holders of government debt. The result is that nothing really changes. Each generation has exactly the same amount of consumption that it had before the government borrowed.

In effect, then, private individuals can undo the intergenerational effects of government debt policy so that tax and debt finance are essentially equivalent. This view, that the form of government finance is irrelevant, is often referred to as the Ricardian model because its antecedents appeared in the work of the nineteenth-century British economist David Ricardo. (However, Ricardo was skeptical about the theory that now bears his name.)

Barro's provocative hypothesis on the irrelevance of government fiscal policy has been the subject of much debate. Some reject the idea as being based on incredible assumptions. Information on the implications of current deficits for future tax burdens is not easy to obtain; indeed, as emphasized earlier in this chapter, it isn't even clear how big the debt is!

On the other hand, it could be argued that the ultimate test of the theory is not the plausibility of its assumptions, but whether or not it leads to predictions that are confirmed by the data. Some evidence drawn from Canada appears supportive. For a period in the 1970s and 1980s, Carroll and Summers (1987) found that private saving in Canada appeared to move in the same direction, and of similar magnitude, as government deficits. Gramlich (1989), however, found contrary evidence in the United States. He notes that in



the early 1980s there was a huge increase in U.S. federal deficits. If the Ricardian model were correct, one would have expected private saving to increase commensurately; but private saving (relative to net national product) actually fell. Other econometric studies have analyzed the relationship between budget deficits and saving. Although the evidence is mixed, the general finding is that even after taking other variables into account, saving does not increase enough to offset increased deficits (Johnson, 1994; Bernheim, 1987). There seems to be mounting evidence that although some intergenerational altruism doubtless exists, its presence does not render debt policy irrelevant.¹¹

Overview

The burden of the debt is essentially a tax incidence problem in an intergenerational setting. Like many other incidence problems, the burden of the debt is hard to pin down. First, it is not even obvious how the burden should be defined. One possibility is to measure it in terms of the lifetime consumption possibilities of a group of people about the same age. Another is in terms of the consumption available to all people alive at a given time. Even when we settle on a definition, the existence of a burden depends on the answers to several questions: Is the debt internal or external? How are various economic decisions affected by debt policy? What kind of projects are financed by the debt? Empirical examination of some of these decisions has been attempted, but so far no consensus has emerged.

TO TAX OR TO BORROW?

The federal government regularly decides whether to replace aging military planes, helicopters, or frigates, or to expand airport facilities. Provinces finance hospitals, schools, roads, and much else. Should governments raise taxes or borrow more to meet these needs? How to choose between debt and taxes is one of the most fundamental questions in the field of public finance. Armed with the results of our discussion of the burden of the debt, we are in a good position to evaluate several different views.

Benefits-Received Principle

This independent normative principle states that the beneficiaries of a particular government spending program should have to pay for it. Thus, to the extent that the program creates benefits for future generations, it is appropriate to shift the burden to future generations via loan finance. As an example, those who favour debt finance for military aircraft or school buildings may argue that the cost is rightfully borne by future generations who enjoy the benefits of federal defence policy or provincial education systems.

Intergenerational Equity

Suppose that due to technological progress our grandchildren will be richer than we are. If it makes sense to transfer income from rich to poor people within a generation, why shouldn't we transfer income from rich to poor generations? Of course, if future generations are expected to be poorer than we are (due, say, to the exhaustion of irreplaceable resources) then this logic would lead to just the opposite conclusion.

¹¹ For a contrary view, see Barro (1989).

Cuikerman and Meltzer (1989) pointed out that there are individuals who prefer to leave negative bequests to their heirs. Although this is not possible for an individual, it is possible for society where there are many such individuals who support fiscal policies that increase their lifetime incomes at the expense of future generations. A debt-financed increase in public spending, to be repaid in the future, achieves this end. The increased government debt is likely to have several effects. First, higher interest rates (to the extent they occur) increase the rate of return on assets of those who hold wealth. Even those who are relatively poor may favour more debt if they experience this benefit. Second, some individuals benefit directly from the increased spending that the government debt makes possible. Third, since reduced private investment accompanies higher interest rates, those who rely on labour income are adversely affected as labour productivity is lowered. The result is that deficits are more likely when economic growth is more rapid (therefore, future generations will be better off), there are more individuals who have little wealth and who would like to leave a negative bequest, and there are more individuals whose main source of income is from returns to capital. Whether or not public debt increases depends, at least in part, on how different groups are affected and how many votes they have.

As the foregoing makes clear, the changing composition of the body politic affects attitudes toward deficits and debt. Existing political institutions may also affect deficits and debt. There is evidence that the ability to control public deficits and debt is more difficult where there are significant distributional implications of doing so, and where there is instability in the form of weak government coalitions and frequent changes in governments.¹²

Efficiency Considerations

Here the question is whether debt or tax finance results in a higher excess burden. The key to analyzing the debt issue from this perspective is to realize that *every* increase in government spending must ultimately be financed by an increase in taxes. The choice between tax and debt finance is just a choice between the *timing* of the taxes. With tax finance, one large payment is made at the time the expenditure is undertaken. With debt finance, many small payments are made over time to finance the interest due on the debt. The present values of the tax collections must be the same in both cases.

If the present values of tax collections for the two methods are the same, is there any reason to prefer one or the other on efficiency grounds? Assume for simplicity that all revenues to finance the debt are to be raised by taxes on labour income. As shown in Chapter 16 [Equation (16.4)], such a tax distorts the labour supply decision, resulting in an excess burden of

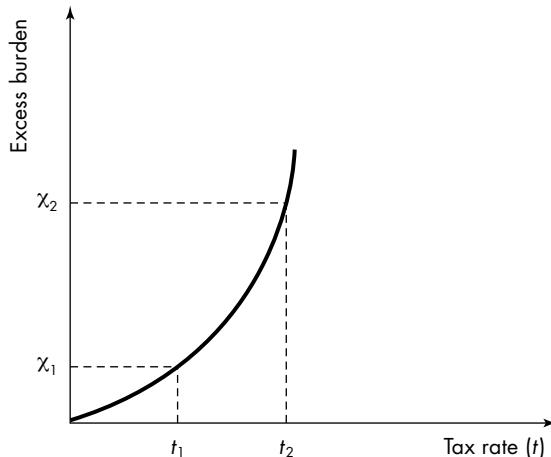
$$1/2\epsilon wL t^2,$$

where ϵ is the compensated elasticity of hours of work with respect to the wage, w is the before-tax wage, L is hours worked, and t is the ad valorem tax rate. Note that excess burden increases with the *square* of the tax rate—when the tax rate doubles, the excess burden quadruples. Thus, from the excess burden point of view, two small taxes are not equivalent to one big tax. Two small taxes are preferred.

¹² See Alesina and Drazen (1991) and Roubini and Sachs (1989) for a discussion of these points.

**FIGURE IC3.1**

The Relationship between Tax Rate and Excess Burden



This point is made graphically in Figure IC3.1, which depicts the quadratic relationship between excess burden and the tax rate. The excess burden associated with the low tax rate, t_1 , is x_1 , and the excess burden associated with the higher rate, t_2 , is x_2 . From an efficiency point of view, it is better to be taxed twice at rate t_1 , than once at rate t_2 . The implication is that debt finance, which results in a series of relatively small tax rates, is superior to tax finance on efficiency grounds. (For further details, see Barro, 1979.)

This argument is correct as far as it goes. However, it ignores another important consideration—to the extent the increase in debt reduces the capital stock, it creates an additional excess burden.¹³ Thus, while debt finance may be more efficient from the point of view of labour supply choices, it will be less efficient from the point of view of capital allocation decisions. *A priori*, it is unclear which effect is more important, so we cannot know whether debt or tax finance is more efficient.

Thus, the “crowding out” issue, which was relevant in our discussion of the intergenerational burden of the debt, also affects the efficiency issue. Recall that for a small open economy there may be little or no crowding out of private investment; and according to the Ricardian model, there is no crowding out. Thus, only labour supply choices can be distorted, and debt finance is unambiguously superior on efficiency grounds. However, to the extent that crowding out occurs, tax finance becomes more attractive. Clearly, as long as the empirical evidence on crowding out is inconclusive, we cannot know for sure the relative efficiency merits of debt versus tax finance.

Macroeconomic Considerations

Thus far, we have made our usual assumption that all resources are fully employed. This is appropriate for characterizing long-run tendencies in the economy. What do short-run macroeconomic models that explicitly allow for the possibility of unemployment say about the choice between tax and deficit finance? In the standard Keynesian model, the choice depends on the level of unemployment. When unemployment is very low, extra government spending might lead to inflation, so it is necessary to siphon off some spending power from

¹³ More precisely, an additional excess burden is created if the capital stock starts out below the optimal level because of, for example, capital income taxes (see Feldstein, 1985: 234).

the private sector—increase taxes. Conversely, when unemployment is high, running a deficit is a sensible way to stimulate demand. This approach is sometimes referred to as **functional finance**—use taxes and deficits to keep aggregate demand at the right level, and don't worry about balancing the budget per se.

When the Keynesian consensus collapsed in the 1970s, so did the almost universal belief in functional finance. While a thorough discussion of the relevant developments in macroeconomic theory would take us much too far afield, a couple of points are worth making:

- If Barro's intergenerational altruism model is correct, people can undo the effects of government debt policy. Government cannot stabilize the economy.¹⁴
- Even in the context of the Keynesian model, there is a lot of uncertainty regarding just how long it takes for changes in fiscal policy to become translated into changes in employment. But successful unemployment policy requires that the timing be right. Otherwise, one might end up stimulating the economy when it is no longer required, perhaps contributing to inflation.

Moral and Political Considerations

Some commentators have suggested that the decision between tax and debt finance is a moral issue. Too much reliance on deficits “is not merely, or even primarily, an economic matter. It reflects moral failing, a defect in the formation of the public’s character and conservatisms” (Will, 1985). Morality requires self-restraint; deficits are indicative of a lack of restraint; therefore, deficits are immoral. The implicit assumption that debt is immoral is a feature of many political discussions of the topic.

As emphasized throughout this text, ethical issues should be considered in the formulation of public policy, so arguments that deficits are immoral deserve serious consideration. One should note, however, that this normative view seems to rest heavily on the unproven positive hypothesis that the burden of the debt is shifted to future generations. Moreover, it is not clear why this particular normative view is superior to, for example, the benefits-received principle, which implies that sometimes borrowing is the morally right thing to do.

A perhaps more compelling non-economic argument against deficit spending is a political one. As noted in Chapter 8 some have argued that the political process tends to underestimate the costs of government spending and to overestimate the benefits. The discipline of a balanced budget may produce a more careful weighing of benefits and costs, thus preventing the public sector from growing beyond its optimal size.

OVERVIEW

Government debt and deficits are an emotional and difficult subject. The analysis in this chapter brings the following perspectives to bear on the debate:

- The size of the deficit during a given year depends on one's accounting conventions. This fact underscores the arbitrariness of any number that purports to be the deficit or the debt.

¹⁴ More precisely, anticipated changes in policy have no impact. Unanticipated changes may have an effect, because by definition, people cannot change their behaviour to counteract them.

- The consequences of large deficits, while potentially important, are hard to measure. And even if we knew exactly what the effects were, the implications for the conduct of debt policy would still depend on ethical views concerning the intergenerational distribution of income.

As stated by Eisner (1986: 176): “Deficits do matter. But to know how and how much you have to measure them correctly. And deficits can be good as well as bad.”

In light of these considerations, it makes little sense to evaluate the economic operation of the public sector solely on the basis of the size of the deficit. What is more important is whether the levels of government services are optimal, particularly considering the costs of securing the resources required to provide these services. A lively debate over the spending and financing activities of government is important in a democracy. The consequences of deficit versus other forms of finance are important and worthy of public consideration. Nevertheless, the tendency of both liberals and conservatives to evaluate the state of public finance solely on the basis of the deficit has tended to obscure and confuse the debate.

SUMMARY

- Borrowing is an important method of government finance. The deficit during a period of time is the excess of spending over revenues; the debt as of a given point in time is the accumulated value of past deficits.
- Official figures regarding the size of government deficits and debts must be viewed with caution for several reasons:
 - More than one level of government is involved. Both the federal government and the provincial governments have run large deficits, and both have large amounts of debt outstanding.
 - Inflation erodes the real value of the debt; the annual deficit does not reflect this fact.
 - Government accounts often do not distinguish between capital and current expenditure. However, the design of a capital budget for the federal government, and other governments as well, faces both conceptual and political problems.
 - Tangible assets owned by the government (and the depletion of such assets) should be taken into account, as should the government's implicit obligations (such as the Canada Pension Plan and promises to pay civil service pensions).
- There is great controversy over the extent to which the burden of debt is borne by future generations. One view is that an internal debt creates no net burden for the future generation because it is simply an intragenerational transfer. However, in an overlapping generations model, debt finance can produce a real burden for future generations.
- The burden of the debt also depends on whether debt finance crowds out private investment. If it does, future generations have a smaller capital stock and, hence, lower real incomes, *ceteris paribus*. However, in a small open economy such as Canada little crowding out of private investment is likely to occur; debt finance results in an inflow of funds from abroad, an appreciation of the dollar, and some crowding out of exports. In a Ricardian model, voluntary transfers across generations undo the effects of debt policy, so that crowding out does not occur.
- Several factors influence whether a given government expenditure should be financed by taxes or debt. The benefits-received principle suggests that if the project will benefit future generations, then having them pay for it via loan finance is appropriate. Also, if future generations are expected to be richer than the present one, some principles of equity suggest that it is fair to burden them.
- Foreign holdings of federal and provincial government debt increased sharply during the 1990s and exceeded \$235 billion in 2000. In 2000, Canada's overall net indebtedness to foreigners was \$244 billion. Dependence on foreign lenders increases the likelihood that Canada's fiscal and monetary policies may be influenced by views outside of Canada.
- From the point of view of efficiency, one must compare the excess burdens of tax and debt finance. If there is no crowding out, debt finance has less of an excess burden, because a series of small tax increases generates a smaller excess burden than one large tax increase. However, if crowding out occurs, this conclusion may be reversed.

DISCUSSION QUESTIONS

1. How would each of the following events affect the federal debt as it is currently measured?
 - a. The government borrows to finance a Canada Day parade.
 - b. Toronto's Pearson International Airport is sold to a group of private investors.
 - c. A law is passed promising each member of Canada's armed forces who serves on a peace-keeping mission a one-time award of \$10,000 at the age of 65.

If you were designing an accounting system for the government, how would you treat each of these items?
2. Explain the logic behind this assertion: "If people care about the welfare of their descendants, then debt policy may not have any impact on capital formation."
3. Canadian peace-keeping forces confronted additional responsibilities and expenditures in the 1990s due to operations in Somalia, Bosnia, and elsewhere. The cost of these activities was not intended to result in cuts to other programs or in tax increases. Discuss the pros and cons of increasing the deficit to finance these peace-keeping activities.
4. Suppose that the compensated elasticity of labour supply with respect to the wage is zero. On efficiency grounds, what are the consequences for the optimal choice between debt and tax finance?
5. Leaders of the Reform, Progressive Conservative, Liberal, NDP, and Bloc Québécois parties have all argued for deficit reduction at the federal or provincial level, claiming that it will be good for the economy. Do you agree that deficit reduction would necessarily be good for the economy? Explain.

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