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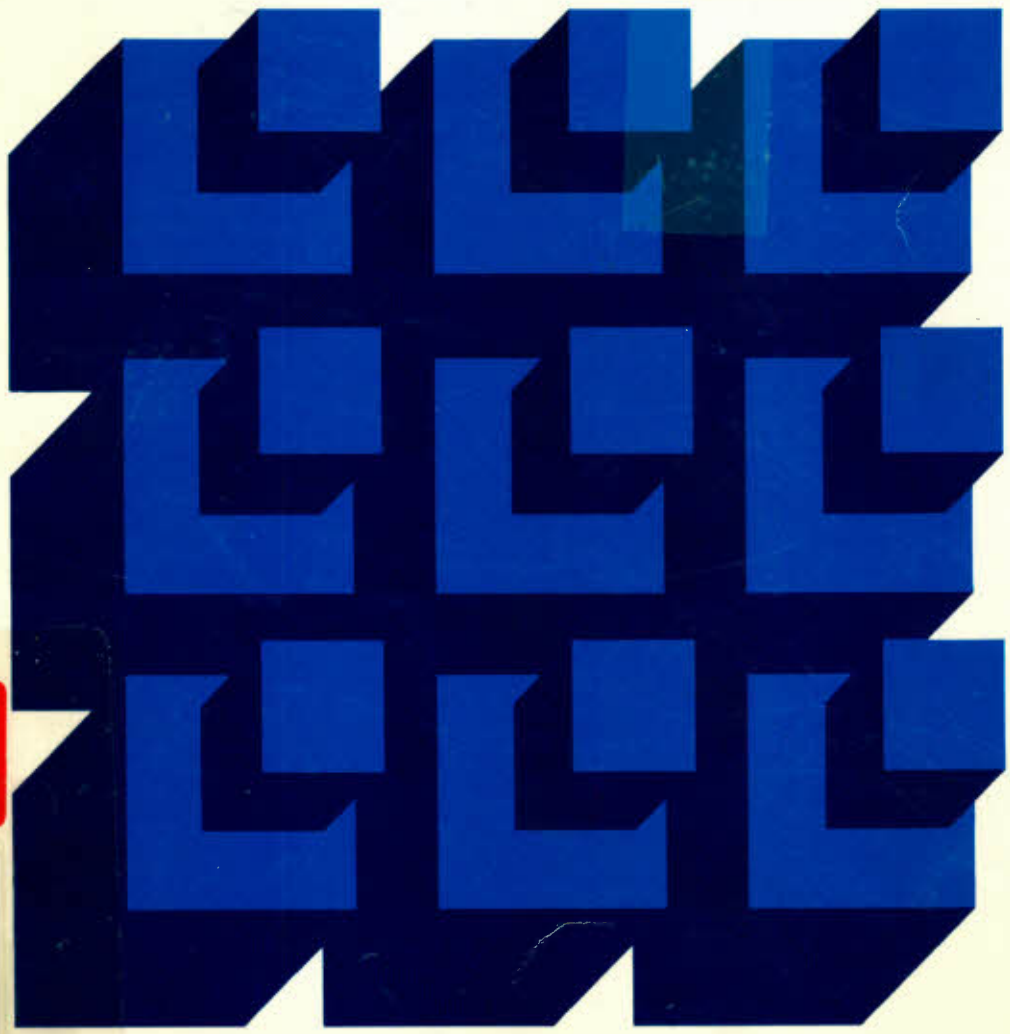

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DISCUSSION PAPER NO. 256

Determining the Subsidy Involved with Government Credit Programs: An Application to a Selected Group of Programs

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Résumé

Dans ce document, les auteurs nous présentent une méthodologie applicable au calcul des subventions offertes par les gouvernements fédéral et provinciaux, par le truchement des programmes de prêts directs et de cautions de prêts. Ils nous exposent deux méthodes, selon le but recherché, pour le calcul de ces subventions : la première se fonde sur les coûts d'option qu'assume l'Etat en offrant un prêt direct ou une caution de prêt, et la deuxième, sur les avantages nets qu'il assure à l'emprunteur. Le premier calcul tient compte des coûts en efficacité imposés à l'économie par le versement des subventions, tandis que le deuxième mesure le transfert de richesses à l'emprunteur.

Selon la première méthode, soit celle des coûts, la mesure inférieure de la subvention en 1979 se situerait entre 210,000 dollars dans le cas du Cape Breton Development Corporation et 19,7 millions pour la Banque fédérale de développement. De même, les taux de subvention, c'est-à-dire la subvention par dollar de prêt, oscillent entre 1,3 % dans le cas de la Banque fédérale de développement et 41,2 % pour la Communities Economic Development Fund du Manitoba. Quant à la subvention incorporée à 14 programmes de prêts directs en 1979, elle s'est élevée à 57,3 millions, ce qui représente 2,7 points de pourcentage de la valeur des prêts.

Par ailleurs, la subvention attachée aux programmes de cautions en 1979 a atteint, dans le cadre du Programme d'expansion des entreprises, la somme de 2,3 millions de dollars. Le taux de subvention le plus élevé (soit la subvention divisée par la valeur du prêt garanti) a été de 4,3 % dans le cas de la British Columbia Development Corporation. Deux programmes semblent rentables, la Manitoba Development Corporation et la Société de développement industriel du Québec. La subvention totale versée aux termes de huit programmes de cautions de prêts, en 1979, a été de 4,1 millions de dollars.

Ces subventions, qui ont atteint la somme globale de 61 millions de dollars en 1979, sont justifiables dans la mesure où l'économie canadienne bénéficie de ces programmes publics de financement qui favorisent les emprunteurs. Il incombe donc aux autorités fédérales et provinciales de justifier ces programmes qui imposent des coûts considérables à l'économie.

Abstract

A methodology is outlined for the calculation of subsidies provided by the federal and provincial governments through direct lending and guarantee programs. Two methods for the calculation of the subsidy are presented, each method depending on the purpose used for estimating the subsidy. The first is based on the opportunity cost to the government in providing a direct loan or guarantee and the second is based on the net benefit provided to the borrower by the government. The first subsidy captures the efficiency cost to the economy arising from subsidy and the second measures the wealth transfer to the borrower.

Under the cost approach, our lowest measure of the subsidy for 1979 ranges from $210,000 for the Cape Breton Development Corporation to $19.7 million for the Federal Business Development Bank. The rates of subsidy (subsidy per dollar of loan) under the same measure vary from 1.3% for the Federal Business Development Bank to 41.2% for the Communities Economic Development Fund from Manitoba. For direct lending programs, we find the subsidy in 1979 for fourteen programs to be at least $57.3 million or 2.7 percentage points of the value of loans.

For guarantee programs we find the subsidy in 1979 to be as high as $2.3 million for the Enterprise Development Program. The highest rate of subsidy (subsidy divided by value of guaranteed loan) was 4.3% for the British Columbia Development program. Two programs seem profitable, the Manitoba Development Corporation and La Société de Développement Industriel du Québec. The total subsidy under eight guarantee programs was $4.1 million in 1979.

These subsidies which wotal almost $61 million in 1979 are worthwhile so long as the Canadian economy benefits from financing which favours borrowers who are assisted by these public programs. It is left to federal and provincial governments to justify these programs which incur substantial costs to the economy.

During the 1970's, there has been a proliferation of federal and provincial government credit programs especially designed to assist the small business sector.[1] Such government intervention raises many questions in relation to the effectiveness and efficiency of these programs in meeting desired social objectives. For many credit programs, the intent is to correct for various imperfections in markets as it is often alleged that small businesses are at a disadvantage compared to large businesses in acquiring capital and other inputs need for production. As a means of correcting these market imperfections, the government subsidizes through cheap credit the investment activities of small businesses. Not only are inefficiencies created, but these credit programs can increase the wealth of the owners.

Regardless of whether credit programs meet stated social objectives, it is necessary to calculate the size of the subsidy implicit in credit programs before evaluating the benefits associated with the subsidy. Our purpose is to discuss various methods by which one can measure the value of subsidies provided through government credit programs. It is hoped that a useful theoretical basis is developed enabling one to measure the subsidy keeping in mind either the benefits to the borrower or the resource costs incurred by the government.

Upon first reflection, it seems that measuring the subsidy involved in credit programs is a relatively simple matter. A subsidy can be viewed as a transfer of money from the government to a recipient. However, there are

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1. These credit programs have included government direct lending of equity or equity or debt funds, grants reducing interest rates charged on funds lent to small businesses and government guarantees or insurance for the repayment of loans.

two methods which may lead to differences in calculating a subsidy.[2] For example, in the case of a direct lending program such as that with the Federal Business Development Bank, one method is to calculate the subsidy in order to judge the monetary net benefits gained by various target groups by acquiring a loan from a government agency rather than from a private lender. If we calculate a subsidy based on this method, we are interested in the effect of the subsidy upon the real income of the borrower. Another method is to calculate the subsidy based on how much cost was incurred by the government. The subsidy can then be measured as the difference between the revenues collected by the government agency and the "costs" incurred by the government in financing the loans. "Costs", however, can be defined in two ways. The cost to the government may be simply a "cash" cost (such as the interest cost incurred in floating government debt to finance loans) or it may be defined as a resource cost (the government's opportunity cost of using capital as a resource which is drawn from alternative uses in the private sector).

Depending on the purpose in mind, we can use either the "net benefit" or "cost" approach to calculate the subsidy.[3] It will turn out that there are some important theoretical differences between the two approaches in measuring the subsidy and these differences can be of empirical significance.

The outline of this report is as follows. In Section I various

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2. We are indebted to John Chant whose discussion helped us improve this argument.
3. Two useful articles on these issues have been written by M. Weidenbaum (1972) and D. Larkins (1972). The Larkin's discussion was especially useful in pointing out some of the above problems in calculating the subsidy.

government credit programs that exist in Canada are described as each type of program will be later considered in dealing with the actual calculation of the subsidy. In Section II, we evaluate two approaches used to measure a subsidy, the actual approach being important to the method used for calculating a subsidy. As discussed above, these approaches include measuring the subsidy according to the government's cost of resources used in providing the subsidy and the other based on the net benefit received by the recipient. In Section III, various methods in calculating the subsidy are described which will be based on the recommended definitions of a subsidy. We calculate the subsidy for twenty government credit programs in Canada. In the final section we report our conclusions.

I. Government Credit Programs in Canada

While there are a large number of federal and provincial government credit programs existing in Canada, these programs can be classified under three general headings: 1) grants, 2) direct lending, and 3) guarantees and insurance. Below we shall describe each of these categories and classify existing credit programs under each heading. This description will be useful for Section III when suggested methods of calculating subsidies will be presented for direct lending and guarantee programs.

A. Grants

Grant programs are those which involve the government paying for a portion of the interest cost of loans borrowed from a private lender. The grant may be paid as a reimbursement for interest costs incurred by the borrower or may be paid directly to the borrower to offset capital expenditures. The

effect of a grant is to reduce the cost of capital paid by the borrower. In Canada, there have been a few programs designed whereby the government subsidizes on an annual basis the borrowing costs of a small business (such as programs under the Quebec Industrial Development Corporation and the Saskatchewan Department of Industry and Commerce). However, there has been more reliance on the use of capital grants which involve the government paying for the initial cost of investment and receiving no payment in return.[4] A good example of a capital grant program that has assisted small business has been that under the Regional Development Incentives Act.

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4. In present value terms it would be easy to show that an interest grant and a capital grant program are equivalent. Let i = annual rate of interest charged on a loan, s = the percentage of interest cost subsidized by the government, k = the cost of investment which is financed by the loan, a = discount rate (which is less than one). For simplicity, we assume a perpetual loan (with no payback period). Then the present value of the cost of investing k is

$$C = \sum_{t=1}^{\infty} a^t \, i(1-s)k$$

Note that it makes no difference to the present value, C, as to whether the grant reduces annual interest costs i(1-s) or whether the grant reduces the initial cost of the investment (1-s)k. If the loan has to be repaid in period T, then the present value of the cost of capital with an interest rate subsidy is

$$\hat{C} = \sum_{t=1}^{T} a^t \, i(1-\hat{s})k + a^T k$$

and the present value of a loan with a capital grant is

$$\tilde{C} = \sum_{t=1}^{T} a^t \, i(1-\tilde{s})k + a^T(1-\tilde{s})k$$

where s can be adjusted so that $\hat{C} = \tilde{C}$.

B. Direct Lending Programs

Direct lending programs have involved the government in lending funds to small businesses through a government department, an agency or a Crown Corporation. The funds that are lent may be in the form of a demand loan, a term loan or the purchase of the small business's equity.

Direct lending programs need not involve subsidy. If we measure a subsidy based on the cost to the government, then the government in creating a direct lending program, could still earn a return on funds lent to a small business which compensates the government for the cost of using public funds. Moreover, if we measure a subsidy based on the net benefit received by the borrower, then the interest rate charged by the government could be the same as that charged by the private lender. However, in actual fact, most direct lending programs created by the government fail to yield a return sufficient to compensate the government for the cost of using its funds or is lower than that charged by a private lender which suggests that an "implicit" subsidy is involved in direct lending.

Unlike the grant program which involves subsidies on loans made by private lenders, the government may choose to lend funds to small businesses at low (subsidized) rates of interest. The main difficulty in assessing the subsidy is determining what would be the interest rate charged by the government without a subsidy. We return to this issue in the next section.

C. Guarantee and Insurance Programs

The third type of government credit program for small business has been that which requires the government to cover the cost of a default on a

loan borrowed from a private lender. The government guarantees to the lender that the loan's principal and interest will be repaid. If the borrower defaults, either the government becomes liable for the loan (guarantee program) or it pays the borrower the amount of funds required to satisfy the lender when default occurs (insurance). A guarantee is equivalent to a direct loan if the interest charged by the government on a direct loan is equal to the risk free rate of interest.

Since the government assumes liability in case of default, the lender need not charge a premium in the rate of interest to compensate for the possibility of the borrower defaulting. In the case of a guarantee program, a subsidy is involved when the government chooses not to charge the borrower (i) a fee to compensate for the risk of default (if we wish to use "cost to the government" approach to measure the subsidy) or (ii) a fee that would be charged by a private guarantor (if the subsidy measured is based on net benefit received by borrower).

As an alternative to a guarantee, the government could provide insurance for a loan to be repaid. In the case of an insurance program, a subsidy is involved if the government does not charge a premium (i) to compensate for costs of providing insurance (including the cost of holding actuarially sound reserves) or (ii) lower than that would be charged by a private insurance agent.

In Table I below, we classify a number of small business lending programs according to whether the program involves direct lending or guarantees/insurance. We provide information on the year of inception of the program, its size and its main activity. We do not include grant programs as calculating subsidies for these programs goes beyond the mandate of this study.

Table I

Classification of Existing Federal and Provincial Government Credit Programs in Canada Intended to Assist Small Businesses
(* subsidy calculated for this agency or program)

Type of Program	Name	Year of Inception	As of March 1979 Size ($millions) Loans and Investments	Guarantees	Activity
Federal	The Federal Business Development Bank*	1974[1]	1657.5	12.1	Lends loans and some equity
	The Enterprise Development Program*	1977	17.9	160.0	Assistance for Research and Development
	The Cape Breton Development Corporation*[2]	1967	2.9	19.5	Assistance for businesses in Cape Breton
	The Canada Development Corporation	1971	1792.2	-	Equity financing of large and small businesses
	The Defence Industry Productivity Program	1959	18.9	-	Assistance for Defence technology
	The Small Business Loans Act*	1962	-	61.7	Guarantees for small businesses
	Department of Regional Economic* Expansion	1969	-	13.4	Provides mostly capital grants but some guarantees are given in slow growth regions
Newfoundland	The Rural Development Authority (Nfld)*	1974	7.3	-	Primarily loans to certain sectors
	The Newfoundland Industrial Develpoment Corporation*	1967	16.0	-	Primarily loans to businesses
	The Newfoundland and Labrador Development Corporation*	1972	13.6	-	Primarily loans to businesses

1. This agency replaced the "Industrial Development Bank" created in 1944.
2. "Industrial Development Section" only.

Table I (Cont'd)

Type of Program	Name	Year of Inception	As of March 1979 Size ($ millions) Loans and Investments	Guarantees	Activity
Prince Edward Island	P.E.I. Lending Authority*	1969	5.2	-	Lending for tourism, agriculture and fisheries
	Industrial Enterprises Incorporated*	1966	17.4	0.6	Primarily lending
Nova Scotia	The Nova Scotia Resources Development Board*[1]	1970	65.2	3.8	Primarily loans given
	Industrial Estates Ltd.*	1958	94.2	0.8	Primarily loans given
New Brunswick	Financial Assistance to Industry Program (New Brunswick)*	1976	28.5	60.0	Assistance to manufacturing
	Provincial Holdings Limited	1975	3.2[2]	-	Equity Investments
Québec	La Societé de dévelopment industriel du Québec*	1971	119.4	120.6	Primarily loans given
	La Societé générale de financement du Québec	1962	580.6	-	Equity investments
	Societé québécoise d'initiative agro-alimentaire	1975	13.1	-	
Ontario	The Ontario Development Corporation*	1966	186.4	13.9	Primarily loans given
Manitoba	The Manitoba Development Corporation	1970	27.4	4.0	Both equity and loans provided
	The Communities Economic Development Fund*	1971	1.5	-	Assistance to peripheral regions
	The Cooperative Loans and Guarantee Board	1971	-	-	Negligible loans and guarantees

1. Includes the "Industrial Expansion Fund" and the "Industrial Loan Fund".
2. Estimate.

Table I (Cont'd)

Type of Program	Name	Year of Inception	As of March 1979 Size ($ millions) Loans and Investments	Guarantees	Activity
Saskatchewan	The Saskatchewan Economic Development Corporation	1963	133.1	3.3	Both equity and loans are provided
	Northern Saskatchewan Development Act	1974	6.0	-	Loans only
Alberta	The Alberta Opportunity Company*	1967	82.2	0.8	Primarily loans provided
British Columbia	The British Columbia Development Corporation*	1973	24.5[1]	6.3	Primarily loans provided
	British Columbia Resources Investment Corporation	1977	41.1	-	Equity investments

1. Includes $15.3 million of loans outstanding of the "Low Interest Loan Assistance Program".

Source: Economic Council of Canada.

II. Approaches for Measuring a Subsidy

We have already mentioned two approaches based on the purpose in mind that may be used to measure a subsidy. The first approach considers the cost incurred by the government in providing the subsidy (this is the subsidy from the grantor's point of view). The second considers the net benefit received by the recipient in terms of the recipient's reduced costs of production or increase in net revenues earned (this is the subsidy from the recipient's point of view). We first outline in more detail each of these approaches and then we will contrast the implications of each approach in regard to the calculation of the subsidy.[5]

A. The Cost Approach

A subsidy may be defined as a transfer of resources from the government to individuals or firms without receiving any commodity (including tax money) or service in return. A direct subsidy is the payment of public funds (treasury funds) to the recipient as with any cash grant given to an individual or company. An indirect subsidy is a transfer of resources whereby the government fails to charge a fee to recover the costs incurred by the government in providing the subsidy. For example, the granting of an interest free loan to a private company does not allow the government to earn revenue to offset the cost of using public resources such as those resources needed to administer and finance the loan.

Having stated the above first definition of a subsidy, it would be

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5. Larkins (1972) also considered the cost and price approach to measuring a subsidy. The only difference here is that we use "net benefit" as a substitute for "price" in the discussion of the two approaches to measuring a subsidy.

useful, perhaps, to explain in more detail the concept of the "costs to the government" of providing a subsidy. If one were evaluating the cost of using capital or labour by a private firm, then the cost of using a unit of resource is income foregone that would have been earned by using the resource elsewhere (this is the private firm's opportunity cost of using the resource). A profit maximizing firm would hire a resource unit until, for the last unit employed, the gain in revenue is equal to its opportunity cost. For labour, the opportunity cost to the firm of hiring the last unit is the (pre-tax) wage rate, and for capital, the opportunity cost is the (pre-tax) rate of interest.

Costs incurred by the government may be measured in two ways. One method is by calculating the cash costs incurred in providing the subsidy. For example, consider a direct loan made by the government. If the government issued a treasury bill to finance a loan, then the cost of providing the loan is the interest paid per year to pay off the debt. If, however, the government financed the loan by using tax revenue then the cash cost may be thought of as the interest cost arising from the need to raise additional debt to finance other government expenditure (the treasury bill rate) or the cash cost of raising additional tax revenue from the citizens. With regard to the latter, the cash cost could be negligible which would suggest that tax financing of government loans is costless. However, by considering cash costs only, we assume that the government is only concerned about budget balance, not about social welfare.

Alternatively, one could argue that the costs incurred by government, are the social benefits foregone in not using resources elsewhere (i.e. the social opportunity cost of using a resource). The government should use

capital and labour if the gain in social welfare is greater or at least equal to the social opportunity cost of using the resource. As an example, the social opportunity cost of raising a unit of capital by selling bonds to the public or raising tax revenue depends on how much of each dollar of capital raised is from new savings diverted from consumption (which is evaluated at the after tax rate of interest) and from savings diverted from productive investments in the private sector (which is evaluated at the pre-tax rate of interest).[6] Usually, the government's opportunity cost of using a resource is different from that of the private sector's because of the existence of distortions in markets: taxes or subsidies on factors of production and final commodities, monopoly pricing (price greater than marginal cost), externalities (non-marketed goods and services such as maintenance of national unity) and the use of unemployed factors of production. In the above example regarding the social opportunity cost of capital, it is easy to see that without any distortions in the economy (such as no taxes levied on return to capital), the government's social opportunity cost of capital is equal to the rate of interest which is

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6. The above argument follows that in the well-known article by A.C. Harberger (1969). For a lucid discussion on issues related to the social opportunity cost of using a resource see R.W. Boadway (1979, pp. 181-188). With the above example, we should caution the reader that the social opportunity cost of capital depends on other important variables as well. For instance, the social opportunity cost may depend on how the government finances its use of a resource (debt or tax finance). Moreover, the social opportunity cost of capital depends on whether public or private returns to capital are reinvested. The social opportunity cost of capital also depends on distortions in other related markets (i.e.: tax on labour for example). The existence of other distortions may raise or lower the social opportunity cost of capital (see for example, Marchand, Mintz and Pestieau (1982)). Finally, the social opportunity cost of capital may also depend on whether the government's use of funds leads to production that is a substitute or a complement for production by the private sector. Thus, if the government raises capital to subsidize some sectors of the economy, the social opportunity cost of capital will be lower (higher) than that recommended by Harberger if the subsidy given for the production of goods and services are complements (substitutes) in relation to private production (see Oguru and Yohe (1977)).

the same for all sectors of the economy from which savings are diverted. Moreover, the social opportunity cost of capital when distortions do not exist will be equal to the opportunity cost of capital for a profit maximizing firm.

It should be noted here that the cash cost of funds as discussed above will be equivalent to the social opportunity cost of capital under certain conditions. If the government finances the activities of public intermediaries which displaces private intermediary lending to businesses, then the opportunity cost of the government lending program is the interest rate on loans forgone by private finance. If this interest rate is close to the interest cost of government bonds then the cash cost of funds will be equal to the interest cost on government bonds.

In Section III we shall discuss in more detail the measurement of the cost of resources used by government when providing subsidies to small businesses through credit programs. As pointed out in footnote 4, there is much more that can be said with regard to the social opportunity cost of using a resource, many of the points which will be important for the measurement of the social opportunity cost of using the government's resources to operate subsidy programs.

B. The Net Benefit Approach

With the cost approach, we have chosen to concentrate on the failure of the government to recover the social opportunity costs of using resources as a method of measuring the subsidy involved. There is, however, an alternate approach which is theoretically different from the one that we have thus far suggested. A subsidy could be considered as the net benefit received by the recipient which is the difference in costs incurred or net revenues earned

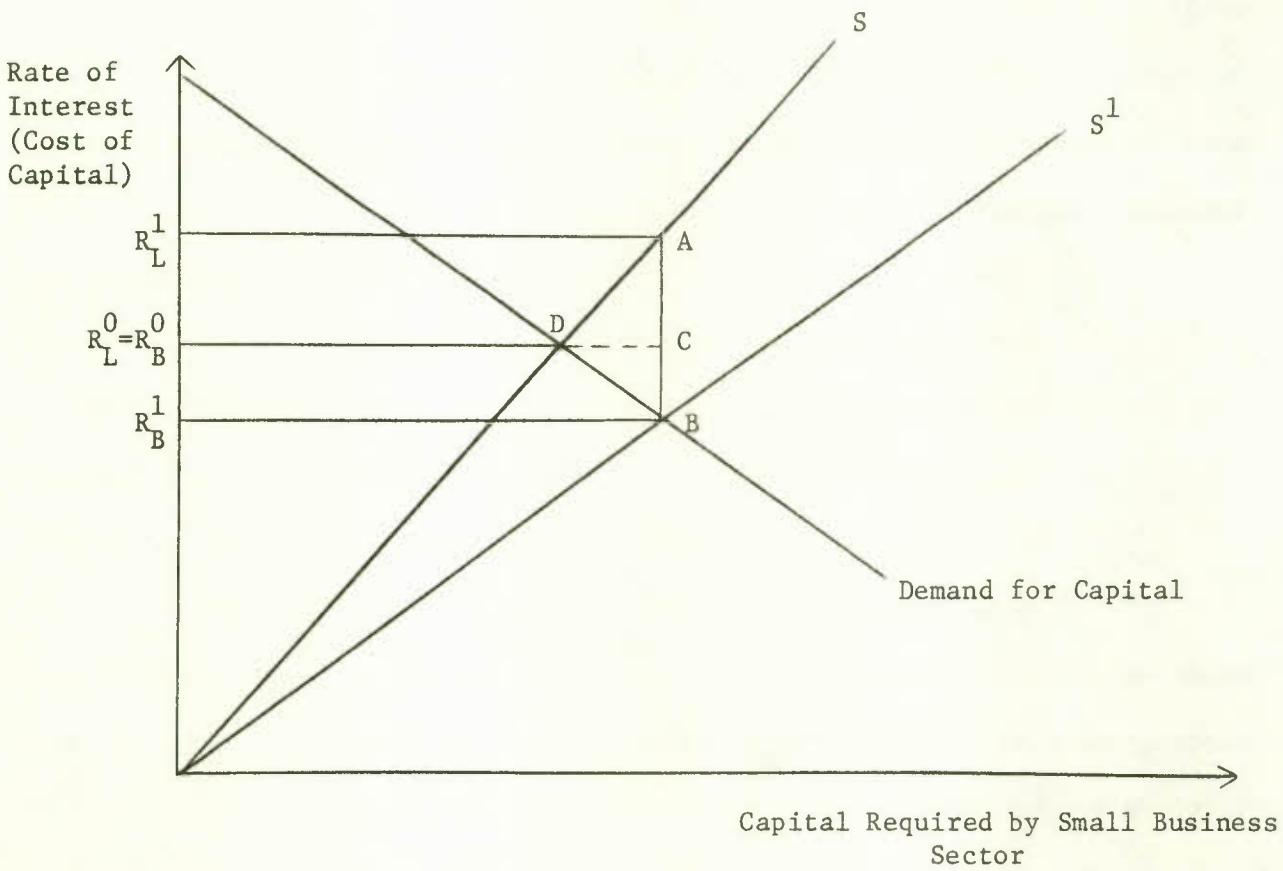
by the borrower before and after the subsidy is granted. Thus with a subsidy given by the government to reduce the borrower's interest costs of a loan, the subsidy would be measured by the difference in the interest rate that would be charged by the private lender before the subsidy is granted and that after the subsidy is granted. We can thus think of the subsidy under the net benefit approach as a measure of real income gained by the borrower.

When measuring the subsidy implicit in credit programs according to the net benefit definition, it is not a simple matter to determine the interest rate that would be charged by a private lender. Consider the following.

Suppose that loans made to small businesses are differentiated from those made to other businesses in terms of risk, quality and size. Small businesses have a fixed amount of equity and finance investment expenditure at the margin by loan debt. Suppose further the opportunity cost of supplying loans to the small business rises with an additional unit of loans provided by competitive lenders because, with a rise in the debt/equity ratio, the cost of bankruptcy rises. Thus the small business sector does not take the interest cost as parametric. If the government gives an interest rate subsidy to the small business sector then the private lender's rate of interest charged for capital borrowed by small businesses may need to rise. In the diagram below, the supply curve, S, reflects the assumption that supply of funds to the small business sector is upward sloping (the opportunity cost of making loans rise with the amount of loans made). If the government provides a grant to small businesses as a percentage of interest costs, then the cost to the borrower falls from S to S^1. The borrower's cost of capital falls from the interest rate level R_B^0 to R_B^1 and the lender's interest rate charged rises from R_L^0 to R_L^1. The total grant given by the government is the area

$R_L^1 R_B^1$ AB. However, according to the net benefit definition, the subsidy would be calculated as $R_B^0 R_B^1$ CB which is clearly less than the size of grant. The reason for the subsidy to be lower under the net benefit definition than the size of the grant is that part of the subsidy is beneficial to the lender, the benefit being the economic rent or producer surplus ($R_L^1 R_L^0$ AD) as well as the extra opportunity cost incurred by the lender in providing additional loans, ACD. On the other hand, if the small business sector took interest rates as

Diagram I



parametric and faced a perfectly horizontal supply curve of funds then the net benefit definition of the subsidy would be equal to the size of the grant (the area $R_L^1 R_L^0$ AC would disappear and subsidy would be the area $R_B^0 R_B^1$ CB).

A Comparison of the Cost and Net Benefit Approaches

In this section we compare the use of either the cost or the net benefit

approaches towards measuring a subsidy. In the previous section, we already had shown that the net benefit approach of a subsidy may be less than the actual size of the subsidy when the supply of credit to the small business sector is positively related to the rate of interest. In fact, it would be easy to illustrate that the cost definition of subsidy in Diagram I would have corresponded to the actual size of the subsidy.[7]

For simplicity, we assume in this section that the supply of loans to small business sector is perfectly elastic (i.e.: constant costs) which would be true if small businesses take interest rates on loans as given (i.e.: no increase in the cost of credit is associated with additional loans provided). When comparing the two approaches toward measuring a subsidy the following two important differences will be kept in mind:

1. The opportunity cost of resources used by government may differ from that used by the private sector.
2. If privately-owned financial firms operate in noncompetitive markets, the interest rate charged may be in excess of the opportunity cost of supplying the capital, thus enabling the private lender to earn pure profits.

Below we distinguish between the following classes of credit programs (i) direct lending and (ii) grant guarantee and insurance credit programs. With the first category a government agency provides the loan when the opportunity costs of

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7. Under the cost approach, the cost of the subsidy per unit of loan is the difference between the interest rate earned by the lender R_L^1 and the interest rate paid by the borrower R_B^1. The total cost of the subsidy is the area $R_L^1 R_B^1$ AB. Unlike the net benefit approach the cost approach includes in the measure of the subsidy both the producer surplus and the extra opportunity cost incurred by lenders in providing the loan.

providing the loan differs from that of the private lender. With the second category the government subsidizes credit extended not by a public agency but by private lenders.

(i) Direct Lending

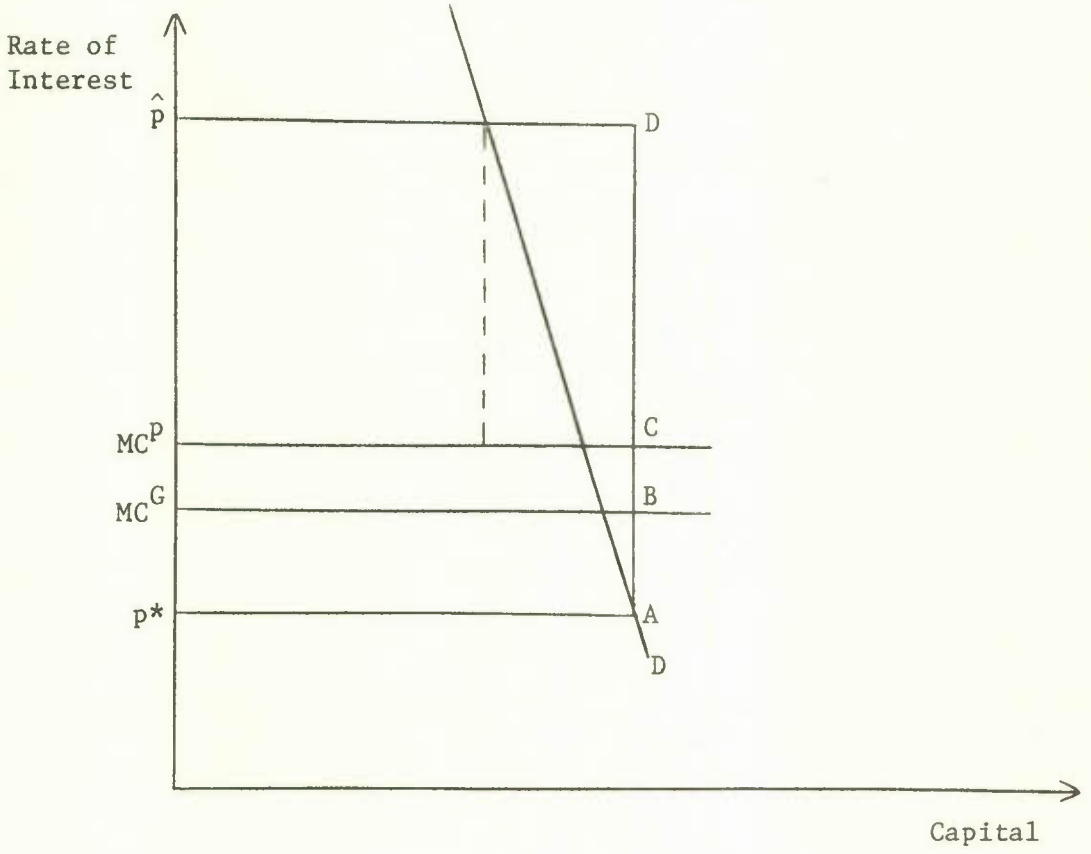
Considering direct lending programs, we make the following assumptions. First the government's opportunity cost of acquiring resources to finance the capital given to small business is lower than that of the private sector. This innocuous assumption is used for illustrative purposes and has no bearing on our final conclusions which rests on the differences in resource costs incurred by the government and private lenders. Let MC^G and MC^P denote the constant marginal cost of providing loan capital incurred by the government and private institutions respectively. With the demand curve for capital being downward sloping under the assumption of decreasing marginal revenue product, we can differentiate between the effects of a profit maximizing monopolistic and competitive financial industry. The former charges an interest rate $\hat{p}$ which is excess of MC^G and determined by the output where the marginal revenue (MR) curve intersects with MC^P (where MR is twice the slope of the straight line demand function and not shown). For the competitive industry, $P=MC^P$ and no pure profits are thereby earned.

We can now compare the measure of a subsidy using the cost and net benefit approaches. Let p* denote the interest rate paid by the small business sector after borrowing directly from the government lending agency. The size of subsidy as measured under each approach is as follows:

1. Cost Approach: If the subsidy is simply the amount of funds not being charged by the government for the use of resources, then the indirect subsidy can be measured as the area $AB(MC^G)p^*$.
2. Net Benefit Approach:
   (a) Competitive Private Lender: Under the net benefit approach

we consider the benefit the small business sector receives by borrowing from the government rather than the private sector. With $P=MC^P$, the subsidy would be equal to the area $AC(MC^P)p^*$.

Diagram II



(b) Monopoly Private Lender: With monopoly pricing the subsidy becomes $AD(\hat{p})p^*$ which is the largest measure of subsidies.

We can conclude that if the cost of borrowing funds is lower for the government compared to the private lender and if the private lender operates in noncompetitive markets, that the value of subsidy is lower under the cost approach as compared to the net benefit approach. If, however, the govern-

ment's cost of using resources is higher than that of the private lender's ($MC^G > MC^P$) then it is possible for the cost approach to yield a higher measure of the subsidy.

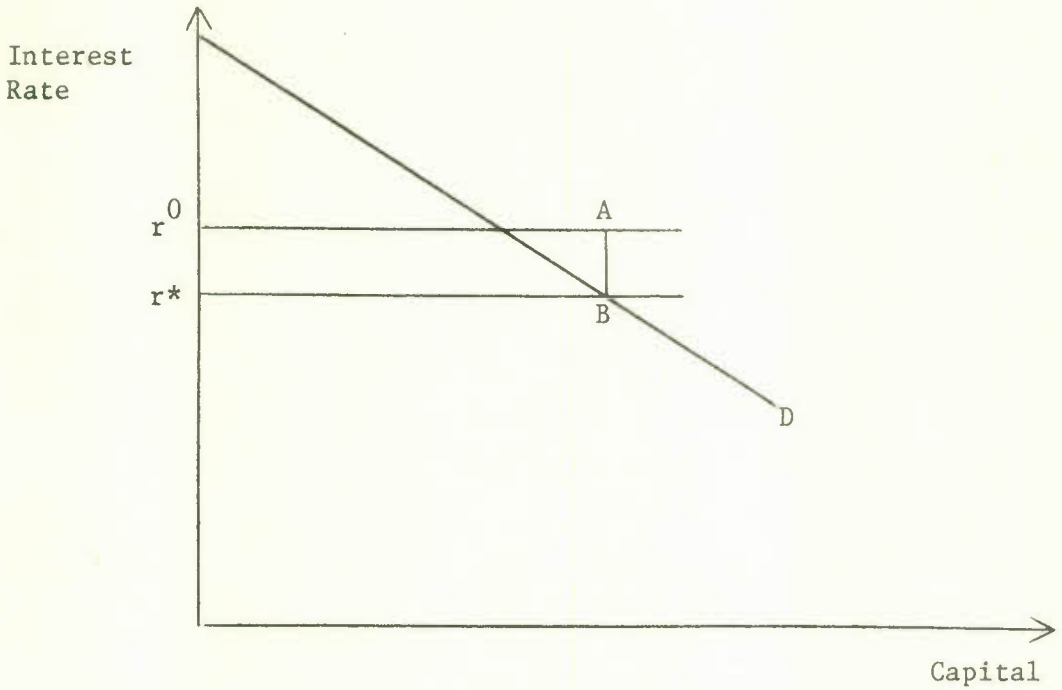
In Section III, we consider measuring the subsidy for government direct lending under the cost and net benefit approaches. There are a number of difficulties in measuring the cost to the government of supplying funds (cost approach) and the interest to be charged by the private lender (net benefit approach) but these matters shall be discussed later.

(ii) Grant Guarantee and Insurance Credit Programs

With grant and guarantee programs, somewhat different considerations are involved since the private lenders with government assistance continue to lend to small businesses. To capture the differences between the two approaches towards measuring a subsidy, we present the following diagram on next page.

Let r^0 be the constant opportunity cost of a private lender supplying capital to the small business sector. Let r* be the interest rate charged to the borrower after the government either grants funds, guarantees or insures the loan. The guarantee or insurance has the effect of reducing the private lender's cost of the supplying loan since the private lender does not incur the cost of default and may not need to evaluate the worthiness of the loan. Assuming that the private lenders are competitive and the government does not charge a fee or premium to recover the cost of the guarantee or insurance, then the capital borrowed by the small business would be determined in equilibrium where demand equals supply (at r*). One may note that the main difference between the guarantee and direct loan is that the government's cost of funds may differ from r_0 if the government provided the loan itself and that the government could charge an interest rate different than r* on a direct loan.

Diagram III



Under the cost approach, the subsidy would include the size of grant given or, with a guarantee or insurance program, the cost of absorbing the risk of default and the evaluation of the loan by the government. This subsidy would be measured by the area ABr^0r^* where r^0 is the interest rate that government would charge to recover the subsidy.

Under the net benefit measure of a subsidy, we could consider the area ABr^0r^* as the subsidy given by the government, where r^0 is the interest rate that would be charged by private lenders in absence of a subsidy. If the government would want to charge the same interest rate, r^0, to recover the costs of the subsidy, then there is no difference in the measurement of a subsidy under the net benefit and cost approaches (with constant marginal cost of supplying credit).

Nonetheless when considering guarantee or insurance programs, there

are important differences between the interest rates that would be charged by private and public lenders in the absence of the subsidy. Suppose the private lender would charge too high (low) an interest rate to compensate for the cost of default. This may arise when the private lenders are more pessimistic (optimistic) or more (less) risk averse than the government in valuing the cost of default. Then the net benefit approach may measure a subsidy greater (lower) in value than that under cost approach. For example, it may be suggested that the government is risk neutral and hence the cost of default would depend on the expected loss resulting from defaulting loans made to small businesses. If private lenders are risk averse, then they will charge a higher interest and the measure of the subsidy under the net benefit approach would be higher.[8]

It would be difficult to judge whether the cost of default would be higher to the private lender than to the government unless one had two loans to compare where one loan to a small business has a government guarantee or insurance and the other has no guarantee or insurance as such. Most small businesses differ in so many ways as to the industry they operate in, the ability of the entrepreneur, etc. that it would be difficult to compare loans as such.

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8. However, if private lenders are financial institutions that are risk neutral as a result of diversification in stock markets by individuals, then the cost of default to the institution will be the same as that of the government given homogeneous expectations. See E. Malinvaud (1972) for a discussion of the Arrow-Lind (1970) theorem. See also J. Mintz, "Spanning, Unanimity and Financial Intermediation in Developing Capital Markets", Queen's Discussion Paper, No. 370, where it is shown that when there are a sufficient number of financial intermediaries, the intermediaries will act as risk neutral agents.

Even though there may be no difference in the cost of default between public and private lenders, it is possible that the government would need more resources to evaluate the worthiness of a loan since private lenders can take advantage of their general expertise in financial markets, while governments have to establish a special administration of the program. Thus the measure of subsidy would be higher under the cost approach compared to the net benefit approach since the additional transaction costs incurred by the government in handling the loan would be included.

Before concluding this section, one more issue shall be addressed here. It could be argued that, when measuring a subsidy, one should subtract additional taxes raised from the value of subsidy. Such would be suggested for computing the subsidy under both the net benefit and cost approaches. For example, when the government gives an interest rate subsidy to a firm, the cost of a subsidy will be reduced if both labour and capital used in production are taxed and if the newly produced output allows the government to earn additional sales and excise taxes. This argument is only true, however, if new or unemployed resources are being used. Otherwise, a subsidy given to a firm may only result in resources drawn from other sectors, thereby reducing taxes raised in those sectors. Even if additional taxes are earned by the government, it would be perhaps more useful to consider these taxes as part of the benefits accruing from the granting of the subsidy. The subsidy is an expenditure intended to assist a firm and by subtracting those taxes generated indirectly, one may be underestimating the impact of the subsidy on the economic activity of the small business sector. For instance, if the subsidy net of additional taxes is zero, then one may argue there is no subsidy even though economic activity has been surely affected.

III. Calculating the Subsidy for Credit Programs

We now present methods by which we may calculate the subsidy under the cost and net approaches for two types of government credit programs: guarantee (and insurance) programs and direct lending. Guarantee programs are first treated since the calculation of a subsidy is simplest. Afterwards, the subsidy given to small businesses arising from the direct lending activities is computed where we will find that the calculation is more complex.

A. Guarantee Programs

The distinguishing factor related to guarantee credit programs is that the private lender incurs the cost in handling the loan transactions except for the cost of default and cost of using resources to judge the credit worthiness of loans. These costs are passed on to the government. In the case of some guarantee programs such as under the Small Business Loans Act, the cost of judging the credit worthiness of a loan is still borne by the financial institutions. In addition to the cost of default, there are administrative costs borne by government.

Using the cost approach, the subsidy given to small businesses may be calculated as:

(1) Cost of Default: Claims less recoveries

+(2) Cost of Processing Loans: Administrative Costs

-(3) Government Fees Charged

The second part of the subsidy is simplest to understand. It includes the cost incurred by the government to judge the credit worthiness of

applications for a government guarantee. These administrative costs include labour, capital and material expenses. There is an issue as to whether resources should be costed at their social opportunity cost rather than at their actual monetary cost to the government. If, however, it is assumed that the resources used are withdrawn from the private sector's productive activities rather than from a new supply of resources, then actual cash costs would be appropriate to use.[9]

The first item, the cost of default, is less straightforward to measure theoretically. One could measure ex post the default as actual claims (less recoveries) each year. However, if the default rate on loans under government guarantee varies year by year, then one might desire to measure ex ante the expected claims (less recoveries) per year as the true cost of default for the government. The latter is the more appropriate measure especially for many of the guarantee programs that are relatively young in age. These programs likely have a low default in initial years after inception with a default experience much greater in the future. Thus, we have to be somewhat cautious about our estimates of the default rate on guaranteed loans since we have to use ex post rather than ex ante data. It may be of interest to note, however, that we did not find any particular relation between the ex post default rate and the age of guarantee program even though the expectation was

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9. The social opportunity cost of a resource, w_s, is

$$w_s = \theta w + (1-\theta)w_*$$

where θ=portion of resource drawn from productive activity, w=private firms' opportunity cost of using the resource (i.e.: before tax wage rate) and w_* is the individual's evaluation of the last unit of foregone activity (i.e.: after tax wage rate). If θ=1, then w_s=w as one would measure under administrative costs.

that younger programs would have lower ex post default rates. Despite this, we recognize the limitations of using ex post data as a proxy for ex ante data. There are better ways to evaluate a guarantee (Jones and Mason (1980)) but we did not have the data to do so.

Even if one can accurately measure the expected rate of default, it would not be correct to measure the cost of risk as the expected rate of default unless the government is risk neutral. Indeed, the government may be concerned about the expected loss, the variance of loss, and covariance of loss on loans under the guarantee program with those returns on other government fiscal measures (i.e.: the government is risk averse). If so, there would be an additional cost over and above the expected rate of default. Unfortunately, data on the government's portfolio needed to measure the government's aversion to risk is not available to us. As a working assumption we assume no cost of risk over and above the cost of default which would be appropriate if the return of the government's portfolio are independently distributed. Hence our measure of a subsidy under the cost approach is understated (overstated) to the degree that the return on loans are positively (negatively) correlated with the general portfolio of returns and the extent to which the government should be risk averse.

Under the net benefit approach, one can compute, in principle, the benefit received by the borrower as the difference between the interest rates charged with and without the government guarantee minus any additional fees charged by the government. Unfortunately there is no data available on interest charges on loans to small businesses with and without a government guarantee so we must infer from the data the value of the difference in interest charges. If the lenders of funds are competitive, the difference in

interest rates would reflect the savings in (i) risk and default costs and (ii) administrative costs saved by the lender when a government guarantee is provided. We have no data on these costs perceived by private lenders so as a proxy we can use the default and administrative costs experienced under the program. Hence, our measure of a subsidy will be the same under both the net benefit and cost approaches.

The annual cost due to default was computed as follows. Assuming risk neutrality, the cost of default can be estimated by comparing the expected return on a nonguaranteed loan with that of a guaranteed loan. Let p be probability of no default: in the first period, the probability of no default is p, the second period p^2, the third period p^3, etc. Let r_f be the annual return paid on \$1 of the unguaranteed loan when there is default. If there is default the lender loses both the return and the principal on the loan. Let r be the risk free rate of return and T be the term of loans (expressed in years). At the margin the risk neutral lender will be indifferent between the riskless and risky loan if the discounted expected value of the risk is equal to the opportunity cost of giving up \$1:

$$V = \frac{pr_f}{(1+r)} + \ldots + \frac{p^T(r_f+1)}{(1+r)^T} = 1$$

This can be simplified so that

$$V = \frac{pr_f}{(1-p) + r}\left[1 - \frac{p^T}{(1+r)^T}\right] + \frac{p^T}{(1+r)^T} = 1$$

Rearrangement leads to

$$r_f = ((1-p) + r)/p$$

Thus the return on an unguaranteed loan would be approximately equal to the riskless rate of interest (r) plus the probability of default (assume p is

close to 1). The value of the guarantee is thus the expected default rate on a dollar of the loan which we approximate by using the ex post measure of the default as described above.

In Table II, we measure the cost of the subsidy given by various federal and provincial agencies that provide loan guarantees. It can be seen that the two federal programs, those under the Small Business Loans Act and the Enterprise Development Program account for 90% of the total subsidy given. However, the rates of subsidy are generally small the highest being 4.3% (British Columbia Development Corporation) of average loans guaranteed in 1979. These subsidy rates, moreover, reflect administrative costs and revenues earned by charging fees for providing the insurance. The negative subsidy rates indicate that for two programs (the Manitoba Development Corporation and La Societé de developpement industriel du Quebec) some profit was earned.

B. Direct Lending Programs

(i) The Cost Approach

In measuring the subsidy given on loans to businesses under direct lending programs, one is faced with several complex issues when using the cost approach. The first is whether one should expense the cost of labour and materials used by the government agency of financial intermediary at market wages and prices, as would appear on the accounting statements, or at social opportunity costs. In the discussion of guaranteed programs, we argued that it would be appropriate to use market wages and prices since it would be expected that the government would be using labour and material drawn from productive activities rather than from a new supply of resources. Below, we continue to make this assumption. The second is whether the government should allow for a cost of risk in its evaluation of the profits earned by the state-owned agency or the financial intermediary. In the previous section, we did not include a cost of risk in the measure of the subsidy due to lack of data

Table II

Subsidy Implicit in 8 Agencies Giving Loan Guarantees

As of March 1979

	Value of Subsidy ($000)	Average Loans Guaranteed ($000)	Subsidy per Dollar of Loans Guaranteed %
Financial Assistance to Industry Program (New Brunswick)	466.0	22,481.0	2.1%
La Société de développement industriel du Québec	-552.0	118,380.6	-0.5%
Ontario Development Corporation	116.5	11,606.0	1.0%
Manitoba Development Corporation	-19.0	4,862.5	-0.4%
British Columbia Development Corporation	243.6	5,709.5	4.3%
Enterprise Development Program (Federal)	2,259.0	129,119.1	1.8%
Small Business Loans Act	1,477.0	51,250.1	2.9%
Department of Regional Economic Expansion	137.1	18,532.0	0.7%
TOTAL	4,128.2	361,940.8	1.1%

Source: Economic Council of Canada and various reports.

available. In this section, we will be including a cost of risk in terms of the return that we calculate to private sector assets which are displaced by public debt. Implicitly, the cost of risk will be included in the government's cost of capital. In order to accept this procedure one has to assume the cost of risk faced by financial intermediaries is the same as the general market. The third issue is determining the appropriate return that should be earned on capital invested by the government. This last issue is at the heart of the problem as we shall discuss below.

The Opportunity Cost of Government Funds

With all of the direct lending programs the government owns both the equity and the debt issued by the intermediary. As the government could easily manipulate the interest to be paid on the financial firm's debt that is owned by the government, it would be best to measure a return to both equity and debt held by the government. Moreover, even if the debt is owned by the public, the financial structure of the financial intermediary would, under certain circumstances, be irrelevant in assessing the intermediary's cost of capital.

Once having measured the return to the government's investment one could proceed in calculating the subsidy as the difference between the opportunity cost of government funds and the return earned by the government agency multiplied by assets held by the bank in small businesses. The object of this section is to consider how one can calculate the cost of the government's funds.

We present several methods of computing the cost of capital for the government: one based on cash costs incurred by the government and the other based on the opportunity cost of using resources drawn from the private sector for public use. The first method is to simply compute the average cost of funds for the federal or provincial government if it were to finance

its direct lending program by selling debt to the public. The rationale is to match the maturity structure of assets of the intermediary with the term structure of liabilities since long term interest rates reflect differences in expected inflation rates across future years. We thus calculated the cost of funds according to a weighted average of interest rates payable on newly issued bonds where the weights are described below.[10]

There are two problems associated with the above method of computing the government's cost of funds. First, it could be argued that the government lending agency's investments would be financed at the margin by that bond associated with the highest interest rate. Using Table III, where we calculate the cash costs of funds for the federal government according to a weighted average (Method A), it can be seen that the highest interest rate payable has been associated with a government bond with a term of 10 years and over. The difference between the weighted average and highest interest rate (.8 percentage point) is significant enough to increase substantially the calculation of the subsidy in some cases. Nonetheless, it would be difficult to say that the highest rate of interest is an indication of the marginal opportunity cost of capital since the term structure of bonds differ and the interest rate payable on bonds of various term structures are influenced by such things as expectations with regard to inflationary trends. To estimate the cash cost of funds (as well as the social opportunity cost of capital), we estimated the term structure of loans for each agency and then took an interest rate based on the number of years that a loan was held at a fixed rate of interest (see Table B.1).

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10. The type of bonds issued are treasury bills (3 month and 6 month), 1-3 year, 3-5 year, 5-10 year and 10 year and over government bonds. Using the treasury bill rate was suggested by both Weidenbaum (1972) and Larkins (1972).

Second, it can be argued that there is no reason to assume that the government finances its investments by only debt since it could resort to raising funds through taxation. If raising revenue through taxation has little administrative cost per dollar at tax, then one might suggest that there is no cost to the government in raising tax revenue. Such a notion is far too simplistic as we had argued in Section II, since taxation does create distortions in the allocation of resources in the economy. One can thus attempt to measure the (deadweight) losses associated with distortionary taxes (see Browning (1976)).[11]

This last point suggests that it would be more appropriate to measure a social opportunity cost of capital based on the notion that the government's use of funds should be evaluated according to the foregone benefits of funds being drawn from either private sector production or from private sector consumption. As we suggested in Section II, the former should be evaluated at the pre-tax rate of return to capital and the latter at the post-tax return to capital. The cash cost of funds would be equal to the social opportunity cost of capital if public intermediary lending only displaces private intermediary lending. However, evidence suggests otherwise.

To measure the social opportunity cost of capital, one must calculate the following:

$$SOC = \sum_j w_j \, r_j$$

w_j = share of public funds raised from the jth sector ($\sum_j w_j = 1$)

r_j = rate of return to funds for the jth sector.

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11. This number is extremely difficult to assess. As a very rough estimate, D. Usher has estimated the deadweight loss associated with taxation of labour to be 15% which will be a number falling within our range of estimates.

If the government raised funds, it draws the resource from three general sectors: domestic saving, foreign saving and industrial investment. The task involved in calculating the social opportunity cost of capital is to estimate the weights, w_j, and the rates of return to capital, r_j. The weights that are calculated depend on whether the government finances its investment through the issuance of public debt or by raising tax revenue.

To calculate the return to capital, a formula (Boadway, Bruce and Mintz (1981)) was explicitly derived for measuring the cost of capital of profit maximizing firms which finance investment at the margin by debt and equity. Using these formula, we derive a measure of the marginal cost of capital which would be equal to marginal gross of tax return to capital in each sector.

To estimate before tax rates of return to capital earned on investment expenditures we used the following procedure (as outlined in Table III). First, we attempt to measure the proportion of new investment financed by debt, retained earnings (after corporate tax profits less dividends) and new equity issues. Thus the cost of capital is a weighted average of rates of return earned on debt and equity. We computed the ratios of change in debt and shareholders' equity to the change of total assets for these weights. For the real before and after tax rates of return to debt and equity, see Appendix A for details of calculations. Since government lending agencies are financial institutions, we exclude depreciation from our calculations. The before and after tax real costs of capital are calculated using observed market interest rates for debt and using two measures for a shareholder's rate of return to equity (one based on the inverse of the price-book earnings ratio

in the TSE stock market, and another based on the ratio except that earnings are corrected for inflation). The tax rates used for these calculations include corporate and personal income tax on dividends, capital gains and interest income. We have not included property taxes as they can be considered taxes that finance public expenditure which are beneficial to capital.[12]

These calculations of rates of return to capital provide an estimate different from that obtained by Jenkins (1977) for the following reasons. First, Jenkins calculated a "real" rate of return to capital as income (profits gross of interest paid and adjusted for the replacement cost of inventories and physical capital) divided by capital at replacement values. For our purposes, we would like to calculate a rate of return to capital similar to that of the lending agency where for the latter we have no data allowing for such adjustments. Second, Jenkins' estimates are averaged for the period 1967-74 when later years will be especially required. Third, Jenkins' estimates of real rates of return are based on average not marginal returns. We attempt to measure a marginal cost of capital which may be lower than the average return.

All the above calculations yield private sector evaluations of rates of return. However, because of the existence of various distortions in related markets (taxes, subsidies and unemployed resources), one can make a few additional corrections for social (deadweight) losses or gains arising from

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12. We have also excluded sales and excise taxes under a similar assumption. If all sales and excise taxes were approximately 15% (see Campbell (1981)) then in our measure of the cost of capital, the before tax return to capital would be raised by approximately 1.0 percentage points and our social opportunity cost of capital would be raised by .5 percentage points. This will turn out not to affect our calculations based on range of estimates of the subsidy that we finally compute. The same can be said for property taxes in that the effect of including property taxes would not affect our conclusion later.

Table III

COST OF FUNDS

Method A: Cash Cost of Funds (Federal)

(April 1974 to March 1979)

	Average Proportion of Gov't Debt	Average Interest Yield
Treasury Bills	0.240	8.30
Gov't Bonds 1-3 years	0.356	8.08
Gov't Bonds 3-5 years	0.176	8.32
Gov't Bonds 5-10 years	0.121	8.57
Gov't Bonds 10 years and over	0.107	9.12

Average Interest Rate on Gov't Debt = 8.346%

Source: Bank of Canada, Review.

Provincial cash cost of funds varies from province to province (See Table B.1 in Appendix B).

Method B: Social Opportunity Cost of Capital
(See Appendix for details of calculation)

1. Before Tax Rates of Return

Before tax average interest yield on bonds
(1974-78) (nominal) ..... 10.23%[1]
(real) ..... -4.81%[2]

Before tax return to equity (real) ..... 20.20%[2]
Percentage share of assets
-- Financed by - Debt ..... 55.00%[3]
- Retained Earnings ..... 35.00%[3]
- New Equity Issues ..... 10.00%[3]

Before tax return to industrial investment (real) 6.43%
Before tax social rate of return to industrial investment. 6.54%

2. After Tax Rates of Return[2]

a) Domestic Savers:

After tax average interest yield on bonds (1974-78) (real) ..... -0.60%

Table III (Cont'd)

2. After Tax Rates of Return[2]

After tax return to equity (real)	9.86%
After tax rate of return to domestic savings (real)	4.11%
b) Foreign Savers:	
Canadian Withholding Tax Rate for Most Countries	15.00%
Proportion of Income Received as -- Interest	0.4
-- Dividends	0.6
After Canadian Tax Rate of Return to Foreign Savings (real)	8.10[2]
After Canadian Tax Rate of Return to Foreign Savings (8.1018 x 1.429)[5] allowing for incremental cost of foreign savings	9.26%

SOCIAL OPPORTUNITY COST OF CAPITAL

	Displacement as a Proportion of Government Debt	Real Rates	Nominal[6] Rates
Industrial Investment	0.45	6.54	13.54
Domestic Savings	0.15	4.11	11.11
Foreign Savings	0.40	9.26	16.26

Social opportunity cost of Capital (nominal) = 14.26%

Method C: Follows the same methodology as Method B except that we use the inverse of the price earnings ratio, earnings adjusted for inflation. The Social Opportunity Cost of Capital under this assumption is 16.03%.

Footnotes

1. Source: Bank of Canada; Review, McLeod, Young, Weir Series.
2. See Appendix 1 for calculations.
3. Each ratio is calculated as the change in (i) debt, (ii) retained earnings accounts and (iii) paid-in capital plus contributed surplus (a proxy for new equity) to a change in total assets averaged for years 1974-78. Source: Statistics Canada, Industrial Corporations, 61-207.
4. Estimated from Statistics Canada, (CALURA, Corporation Returns Act).

Table III (Cont'd)

Footnotes

5. Estimate from D. Burgess, "The Social Discount Rate for Canada: Theory and Measurement", Canadian Public Policy, 1981, pp. 383-94.

6. Assuming that the expected inflation rate is 7.0%.

displacing investment or consumption. These other distortions can affect both the evaluation of the social cost of capital and the weights associated with displacing consumption or investment. These corrections are complicated and not reviewed here (see Marchand, Mintz and Pestieau (1982) for a detailed examination of unemployment of labour and a tax on capital). These corrections were made by Jenkins (1977) and Burgess (1981) for labour externalities, foreign exchange externalities, subsidies given for the use of energy and incremental foreign financing costs (the latter two were suggested by Burgess).

As Jenkins and Burgess suggest, we have included an adjustment for externalities arising from labour being unemployed in the private sector with a reduction of private sector investment (see Burgess (1981) for his discussion of Jenkins' correction). Using Burgess' estimates for the correction, we need to add to before tax rates of return the social cost of creating additional unemployment with displacement of private investment (this can be measured as the difference between gross of personal tax wage and the value of leisure multiplied by the amount of labour displaced).

Although the correction has a negligible impact, we have included Jenkin's correction in industrial investment rates of return to capital for exchange rate externalities arising from import tariffs and export subsidies and taxes. The correction is the difference between the controlled exchange rate and the exchange rate allowing for the existence of tariffs/subsidies multiplied by the loss in export earnings.

Finally, as suggested by Burgess (1980), we include in the return to foreign savings an estimate of social loss arising from increasing the return to inframarginal foreign savers when additional foreign savings are attracted.

This correction, which depends on the elasticity of foreign saving (which we assume is 7.0) raises the rate of return to foreign savings as the opportunity cost of foreign financing is raised.

There are two cautions that we wish to note in regard to the above corrections to obtain social rates of return to capital in the private sector. The first is that not all possible corrections are included such as those associated with all taxes and subsidies on alternate factors of production (not just a subsidy on energy), pollution, monopoly pricing, and congestion. Some corrections would raise the social return to private investment, others would lower it. On balance, we are unsure as to what the total impact of all possible corrections would entail. Second, many corrections that are made can be easily disputed as to why they should be included. For example, subsidies and taxes may be purposeful and hence no correction should be made for welfare effects (taxes finance public goods and subsidies may counter various market imperfections or have a distributional impact of some value to a social welfare maximizing government). The displacement of private investment may not lead to more unemployment if industries substitute labour for capital. Externalities such as those associated with pollution may be already corrected for by private or public action. Thus we are not confident that we have made an adequate estimate of social returns to private investment. However, it happens that the sum of corrections to private returns to compute social returns has only small impact on the ultimate value of the social opportunity cost of capital (approximately 0.1 percentage points).

With regard to the weights used to indicate the proportion of public funds financed by capital drawn from private sector investment, domestic savings and foreign savings, we use weights suggested by Burgess rather than by Jenkins. The estimates of the compensated elasticity of foreign and domestic

savings with respect to interest rates used by Jenkins is substantially lower than recent empirical studies (Boskins (1978)) would suggest on long run savings behaviour.

Once we have calculated the real social opportunity cost of capital we add back the inflation rate to obtain a nominal social opportunity cost of capital. Our estimate for the nominal social opportunity cost of capital under Method B is 14.26% and under Method C 16.03%. The difference between the two methods is the treatment of the return to equity as discussed in Appendix A.

Measuring the Size of the Subsidy Under the Cost Approach

Having measured the opportunity cost of capital for government funds, we are now ready to present the methodology used to measure the subsidy given to small business by direct lending programs. In computing the subsidy we computed the net yield earned on investments held by government lending agencies (the net yield being revenue earned less net operating cost per dollar of investment included loan loss experienced by the agency).[13] For new agencies, loans losses using ex post data may underestimate ex ante loan losses, a problem which we have discussed earlier.

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13. By subtracting loan losses from profits we estimated the expected income earned by the public agency. This allows us to use a social opportunity cost of capital which excludes a probability of default on loans. To see this, note the following. Suppose Y is yield and principal earned on a loan paid in the second period if there is no default. Let π be the probability of default and suppose that no yield or principal is earned if there is a default. Assume further that the lender is risk neutral. The present value of a loan can be expressed as $PV = \frac{(1-\pi)Y}{1+r}$ where r is the social opportunity cost of capital. If we divide the numerator and denominator by $(1-\pi)$ we obtain (approximately)

$$PV = \frac{Y}{1+r+\pi}$$

Thus one should discount the yield and principal if no default is experienced by a discount rate which includes a probability of default or discount expected revenues by a default free rate of interest.

One problem in measuring the subsidy is that accounting statements based on historical values do not reflect the unrealized capital gains earned on equity shares held by a financial institution. Hence, the yield earned on investments may not reflect the true yield to the extent that the value of shares held are not reevaluated at their proper market value and the corresponding capital gain accrued on unsold shares is not included in income. For most lending programs, the proportion of equity held to total investments made was relatively small. However, the Canada Development Corporation, Société générale de financement, Manitoba Development Corporation and the British Columbia Resources Investment Corporation had considerable equity so that these lending programs were excluded.

Another problem was that various agencies held significant amounts of government debt (treasury bills) which are not loans made to private industry. For this reason, we calculate the subsidy by first measuring the gross yield earned on loans made to private firms and then subtracting the net operating cost per dollar of loans and investments to arrive at net yield (see Table B.2 for calculations). It is thus assumed that the administrative cost of handling government debt as assets is negligible. We then subtracted the net yield earned on loans from the opportunity cost of public funds to measure the subsidy.

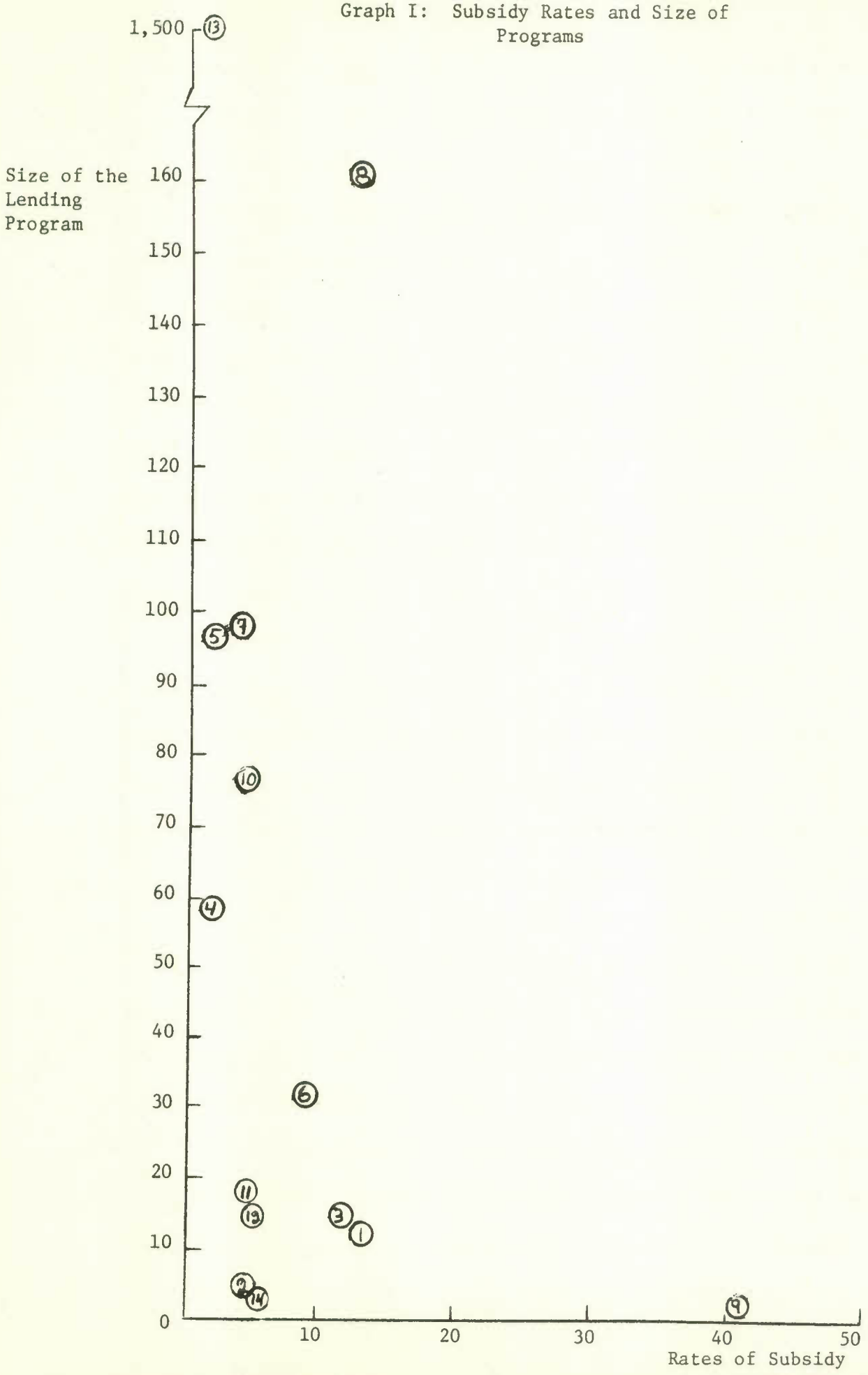
Based on the year 1979 (the year for which accounting data on financial intermediaries was available) we computed subsidies and rates of subsidy for various government lending programs (Table B.3). We provide a range of estimated subsidies based on (i) the cash cost of funds (ii) the social opportunity cost of capital (14.26%) and (16.03%) (iii) and Jenkins' estimate of the social opportunity cost of capital. The rate of subsidy is calculated by dividing the total subsidy by the number of loans outstanding.

For the subsidy calculations based on the cash cost of funds, we provide in Graph I a plot of rates of subsidy and the size of the lending programs for fourteen government agencies. As can be seen for the subsidy rates over 10%, most programs are relatively small (less than $50 million in loans provided), the exception being the Ontario Development Corporation. Five large (over $50 million in loans provided) and four small programs provide loans at relatively low rates of subsidy. Of course, if we compared subsidy rates and the size of the program using measures of the social opportunity cost of capital which are higher than the cash cost of fund, we would find that a similar pattern of rates of subsidy in relation to the size of lending program would emerge although the rates of subsidy would be much higher for all programs.

The Net Benefit Approach

The measure of the subsidy under the net benefit approach is more straightforward if a number of simplifying assumptions are made. First, we assume that a loan made by a government agency to small businesses has no effect on the interest rate charged by private lenders (which is supplied infinite elastically). In this manner, we avoid some of the problems we discussed earlier on page 15 as to measuring a subsidy under the net benefit approach. Second, we assume that private and public firms hold the same type of loan in terms of the probability of default and risk that would be experienced. This second assumption allows us to compare the interest charged by a private lending institution with that charged by public agencies. It is possible that the type of loan held by private institutions are more (less) risky than those held by a public agency such that use of the private institution's interest rate charged would under (over) state the size of subsidy.

Graph I: Subsidy Rates and Size of Programs



Graph I (Cont'd)

Agencies

① Nfld. and Labrador Development Corporation

② PEI Lending Authority

③ Industrial Enterprises PEI

④ N.S. Resources Development Board

⑤ Industrial Estates Ltd.

⑥ Financial Assistance to Industry Program (N.B.)

⑦ La Société Developpement industriel du Québec

⑧ Ontario Development Corporation

⑨ Communities Economic Development Fund (Manitoba)

⑩ Alberta Opportunity Co.

⑪ British Columbia Development Corporation

⑫ Enterprise Development Program (Federal)

⑬ Federal Business Development Bank

⑭ Cape Breton Development Corporation.

We have no data available to us to compare the types of loans made by private and public agencies so some caution must be used to interpret the size of the subsidy.

To measure the subsidy under the net benefit approach, we computed the average interest rate (gross yield) earned on loans and other investments (as before, we excluded from the gross yield the return earned on government debt held by intermediary). We then obtained the interest rate charged by ROYNAT, a privately owned institution, that lends mainly to small businesses. It is our workable assumption that the riskiness of ROYNAT's portfolio is the same as the public agency portfolios. ROYNAT lends at a floating rate (2% above the prime rate) which was estimated to be 12.90% in 1979. Taking the difference between these two interest rates (which is the rate of subsidy) and multiplying by the average loans held by the public agency in 1979 we then calculated the total amount of subsidy under the net benefit approach (see Table B.4). As shown in the table rates of subsidy under the net benefit approach vary from 1.6% (Federal Business Development Bank) to 10.1% (Industrial Enterprises Inc. (PEI)). On average the rate of subsidy under the net benefit approach is 2.4% (or $51.8 million in total for the year 1979).

As a final note, we compare the rate of subsidy under the net benefit approach compared to that derived under the cost approach. Earlier, we had argued the subsidy under the cost approach would be less than that under the net benefit approach if either or both of the following conditions hold: (i) the government agency charges a competitive interest rate which is less than the noncompetitive interest rate charged by a private lender and (ii) the government lender can finance and administer loans at lower cost than private lenders.

In Table IV, the rate of subsidy under the net benefit approach (using the ROYNAT rate) is compared to that under the cost approach (using the cash cost of funds and the social opportunity cost of capital of 14.26%). The data suggests that the rate of subsidy under cost approach may be greater than that under the net benefit approach especially so when using the social opportunity cost of capital. It seems that government agencies handle loans at a higher cost than the private lender outweighing any advantage public agencies give to borrowers in lowering interest rates. Using the cash cost of funds which would only be appropriate if the government debt displaces similar debt issued by firms in the private market, there are only three agencies that provide a lower rate of subsidy under the cost approach compared to that under the net benefit approach. The reason why subsidy rates under the cost approach are so high is not simply that government agencies had funds at low rates of interest (such as Industrial Enterprises Inc. (PEI)) but that many administrative agencies experience substantial administrative costs (Newfoundland and Labrador Development Corporation, Ontario Development Corporation, Communities Economic Development Fund (Man.) and Cape Breton Development Corporation).

One should be cautious in arriving at the above conclusion regarding costs of government agencies in handling loans. In measuring the subsidy under the net benefit approach, we have used the ROYNAT interest rate as the basis of comparing private and public lending agency programs. In some cases, the ROYNAT rate may underestimate the true value of the subsidy under the net benefit approach if the kind of loan undertaken by ROYNAT is less risky, requires fewer resources to evaluate the credit worthiness of the borrower than the public firm or if the public agency provides advice and assistance for

Table IV

A Comparison of Rates of Subsidy Under the Net Benefit and Cost Approaches

Agency	(1) Net Benefit	Rates of Subsidy (%) Cash Cost[2] of Funds	(3) Difference (2)-(1)	(4) Social Opportunity Cost of Capital	(5) Difference (4)-(1)
Newfoundland and Labrador Development Corporation	3.1	13.2	10.1	18.1	15.0
Prince Edward Island Lending Authority	3.3	4.3	1.0	8.2	4.9
Industrial Enterprises Inc. (PEI)	10.1	11.5	1.4	15.4	5.3
Nova Scotia Resources Development Board	5.5	2.2	-3.3	6.5	1.0
Industrial Estates Ltd. (N.S.)	1.8	2.1	0.3	6.4	4.6
Financial Assistance to Industry Program (N.B.)	4.9	9.4	4.5	13.9	9.0
La Société de développement industriel du Québec	3.0	3.8	0.8	7.7	4.7
Ontario Development Corp.	6.2	11.2	5.0	15.6	9.4
Communities Economic Dev. Fund (Man.)	6.8	41.2	34.4	45.6	38.8
Alberta Opportunity Co.	3.7	4.7	1.0	9.8	6.1
British Columbia Develop. Corp.	2.9	4.9	2.0	9.2	6.3

Table IV (Cont'd)

Agency	(1) Net Benefit	Rates of Subsidy (%) Cash Cost[2] of Funds	(3) Differences (2)-(1)	(4) Social Opportunity Cost of Capital	(5) Difference (4)-(1)
Enterprise Dev. Program (Federal)	6.6	5.5	-1.1	11.4	4.8
Federal Business Development Bank	1.6	1.3	-0.3	7.2	5.6
Cape Breton Dev. Corp.	1.9	5.0	3.1	10.9	9.0
Total Average	2.4	2.7	0.3	8.2	5.8

borrowers at no charge (something ROYNAT may not do). Thus, the true rate of subsidy under the net benefit approach would be higher if private lenders carried out the same function as some of the public agencies. An example of this is the Communities Economic Development Fund that has a special mandate to assist cooperative firms in the northern part of the province.

IV. Summary and Policy Conclusions

The measurement of subsidy rates (subsidy per dollar of loan transacted) in Section III indicates that these rates are generally higher under direct lending compared to guarantee programs. On average, the rate of subsidy for guarantee programs was 1.1 percentage points in 1979. The average rate of subsidy for direct lending programs was 2.4 percentage points (using the net benefit approach) and as high as 12.7 percentage points (using Jenkin's 10% real social opportunity cost of capital for the cost approach).

We had already observed the size of subsidy for direct lending program is generally greater under the cost approach compared to the net benefit approach. While we may be underestimating the size of subsidy under the net benefit approach, it is possible that the cost to the government of providing the direct lending program is greater than the benefit (real income) accruing to the borrower of these funds who would have to turn to a private lender otherwise.

Many of these results should be interpreted cautiously. Our methodology may underestimate the cost of guarantees as we have excluded the cost of risk and based our calculation on ex post data. Moreover, the net benefit approach relies on ROYNAT's interest rate which may be too low if ROYNAT lends to less risky firms then public intermediaries.

In calculating the subsidy rates, we ignored any social benefits of particular programs (such as employing unemployed individuals, improving on any imperfections in credit markets, etc.). Assessing the social benefits of each program would be a monumental task which goes beyond what we had originally been asked to do: how to measure the subsidy involved with government credit programs. However, the subsidies and rates of subsidies that we have calculated are useful. Any social benefits of a particular program must be at least as great as the cost of the subsidy involved for the program to be acceptable from the governments point of view. In this case, the appropriate cost to the government of providing the subsidy would be that using the social opportunity cost of public funds. If we use our preferred rate of 14.26% then we suggest that the social benefits per dollar of loans would need to be at least 8.2% for direct lending programs and 1.1% for guarantee programs. These average rates, however, mask the substantial subsidies provided under some programs (most notably the Newfoundland and Labrador Development Corporation, Industrial Enterprises Incorporated (PEI), Financial Assistance to Industry (N.B.), Ontario Development Corporation, Communities Economic Development Fund (Man.), the Cape Breton Development Corporation and the Enterprise Development Program which all have rates of subsidy in excess of 10%). In all cases, a very careful assessment of the worthiness of the credit programs should be undertaken by policymakers to see if the social benefits accruing to each government credit program is as great as the cost of providing the subsidy.

One other question is whether it can be argued that one should choose guarantee over direct lending programs (or vice-versa) as a policy instrument used by the government to provide the same social benefit. If the main purpose of these programs is to provide financing for small businesses because of

any purported capital market imperfections, then the main advantage of the guarantee program is that the cost of running these programs seem substantially less than with direct lending programs. It seems that the cost of administrating programs by public agencies are greater than those costs experienced by private lenders. Guarantee programs have the advantage of using private lending agencies to finance loans, the administrative cost being less than that experienced by the government. It is still necessary for the government to assess the credit worthiness of guarantees made or to provide some incentive for private lenders to conduct such investigations to ensure that borrowers will be assessed properly.

On the other hand, direct lending programs as a means for the government to provide financing for firms have one distinct advantage. In some cases, the government may not wish to provide financing for firms but to achieve some other objective as well. For example, many direct lending programs provide specific advice to entrepreneurs on management techniques (although one must ask why this cannot be done through the normal educational system). If there are other objectives, besides financing small businesses, then direct lending programs may be better suited in achieving these objectives than guarantee programs.

It is our hope that the methodology in calculating subsidy rates will be useful to policymakers in assessing the worthiness of credit programs. In some cases, these subsidies are substantial in terms of their cost to the government and the social benefits accruing to these programs should be calculated to determine if such programs should continue to exist.

Appendix A: Measurement of the Before and After Tax Real Costs of Capital of the Private Sector

APPENDICES

In measuring the real cost of capital of firms, we use the formulae developed by Boadway, Bruce and Mintz (1980 and 1981) for nondepreciable capital. The basic assumptions used to obtain the real cost of capital were the following (i) firms maximize the net worth of their shareholders, (ii) financial and investment policies are determined independently of each other, (iii) firms maintain a constant debt-equity ratio, (iv) inflation rates are constant over time and (v) firms desire to maintain a steady-state use of capital stock. Armed with these assumptions Boadway, Bruce and Mintz (1981) show that the real before tax financial cost of capital is

$$r = \beta i + \frac{\alpha\rho}{(1-\mu)(1-c)} + (1-\alpha-\beta)\frac{\rho}{(1-\mu)(1-\theta)} - \pi\left(\beta+\alpha+(1-\beta-\alpha)\frac{(1-c)}{(1-\theta)}\right)$$

β = portion of capital acquired that is financed by debt

α = portion of capital acquired that is financed by retained earnings

$(1-\beta-\alpha)$ = portion of capital acquired that is financed by new equity issues

ρ = nominal rate of discount of shareholders

i = nominal rate of interest charged on debt

c = capital gains tax on an accrued basis

θ = effective dividend tax rate

μ = effective corporate tax rate

π = the expected rate of inflation

The measure of β, α and i are discussed in the text. The other variables that we calculated are described below.

(i) Shareholders' rate of discount: ρ

There are two methods which may be used to calculate the nominal

discount rate used by shareholders. The first is to take the inverse of price-earnings ratio on the TSE index (earnings being measured as after corporate taxes) as a real rate of discount before payment of personal taxes. This assumes that shareholders use current book profits as the true measure of expected real earnings of the firms and the earnings would rise by the same rate of inflation as the price of the stock. One can calculate a real rate of discount net of taxes.[1] The real after tax required return to equity was calculated to 9.86% using this methodology.

It can be argued however, that the book profits of firms are not a good measure of the expected profits earned by shareholders once taking into account the replacement value of depreciable capital and inventories and deductability at nominal interest costs which distort measures of firm accounting profits (see H. Aaron (1976)). For this reason, we use the measure of real earnings derived by the Department of Finance ("Rate of Return and Investment Profitability", Department of Finance 1980, p. 33). Using the same methodology as before, we obtain a real after tax return to equity using the inflation adjusted series of earnings to be 6.75% which is about two thirds of the measure obtained by not adjusting earnings. The second measure of the real discount rate of equity is our preferred measure. In our calculation of the real social opportunity cost of capital under Method B, we use the lower nominal rate of discount for equity (earnings are adjusted for inflation) while Method C uses the higher nominal rate for equity.

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1. We take real rate of discount to be $\rho_0=(1-\theta)\hat{\rho}$ where $\hat{\rho}$ is the before personal tax real discount rate and θ is the average tax rate on the capital gains and dividends.

(ii) The expected inflation rate: π

The inflation rate taken is a five year average (1974-78) of the rate of change in the GNE price deflator. We estimate this to be 8.78%. (Source: Bank of Canada, Review).

(iii) The corporate tax rate: μ

The corporate tax on marginal investments was calculated by taking an average of combined federal and provincial tax rates weighted by taxable income earned by large, small sized, manufacturing and nonmanufacturing firms by province (see Boadway, Bruce and Mintz (1981) for further details. We estimate from Taxation Statistics (Revenue Canada) that the corporate tax is 41.6% in 1979.

(iv) The dividend tax credit: θ

The effective tax rate on dividends paid from corporate taxable income can be estimated as

$$\theta = (1+p)(m_F - s_F)(1+g)$$

p = provincial tax share of federal taxes paid

m_F = federal marginal rate of tax

s_F = federal tax credit rate

g = gross up rate on dividends paid out

θ = tax rate on \$1 of distributed dividends

For $(1+p)m_F$, an average was taken of combined federal and provincial tax rates based on dividend taxable income by province (for all returns). The federal tax credit rate was 25% in 1978, the gross up rate, 50% and p=.44. We estimate the effective dividend tax rate to be 17.93%.

For foreign savers a withholding tax rate of 15% (paid by most foreign investors) was used to arrive at an after Canadian tax return to foreign savers for dividend income which is the measure of cost of finance from world markets.

(v) The capital gains tax rate: c

The tax on accrued capital gains arising from the use of retained earnings in financing investment was estimated using the methodology described in Boadway, Bruce and Mintz (1981). The formula for the effective accrued capital gains was found to depend on the average holding period of loans, the average rate of increase in share prices, the marginal tax rate on capital gains and the after tax discount rate of shareowners.

To obtain the tax on realized capital gains, we took one half of the estimated marginal rate of personal on net capital gains income earned on shares by the personal income class size with an allowance for individuals who may have less income than $1000 and pay more tax (as under the investment income deduction). This calculated tax rate was 38%. A ten year average growth rate in the Toronto Stock Exchange index was estimated as it was estimated that the holding period was 10 years (this is the average of average annual number of shares issued divided by volume of trade on the Toronto Stock Exchange). The accrued capital gains tax rate in 1979 was calculated to be 17.76% which is almost equal to the dividend tax rate.

Using ρ=6.75, we obtain r = and for ρ=9.86, r=6.43.

The after tax return to equity was estimated as follows. For domestic savers the average of real after tax return on equity and debt were taken. The real after tax return to debt was estimated as

$$i_0 = i(1-m)-\pi$$

where i is the average marginal rate of tax on interest income (after allowing for the investment income deduction was estimated to be 20%) and π are the same as described above. The after Canadian tax return for foreign savers was estimated by using the withholding tax rate.

Social Opportunity Cost of Capital of 10%

This is the real social opportunity cost of capital calculated by Jenkins (see "Capital in Canada: Its Social and Private Performance 1965-1974", Glenn P. Jenkins, ECC Discussion Paper No. 88). To get a nominal rate we add back the average inflation rate and obtain 18.78%.

Appendix B: Calculations of Subsidies

Table B.1

Average Loans Outstanding During Year Ended March 31, 1979 for 14 Agencies and Programs and the Cash Cost of Funds for Each of These Agencies

AGENCY	AVERAGE LOANS OUTSTANDING	CASH COST OF FUNDS
Newfoundland and Labrador Development Corporation	11,277,547	9.32
Prince Edward Island Lending Authority	5,262,274	10.33
Industrial Enterprises Incorporated (PEI)	14,466,030	10.33
Nova Scotia Resources Development Board	59,833,430	9.94
Industrial Estates Limited (Nova Scotia)	96,865,412	9.95
Financial Assistance to Industry Program (N.B.)	31,948,117	9.75
La Société de développement industriel du Québec	98,709,279	10.31
Ontario Development Corporation	160,818,253	9.88
Communities Economic Development Fund	1,678,648	9.79
Alberta Opportunity Company	77,343,231	9.15
British Columbia Development Corporation	19,020,719	9.97
Enterprise Development Program (Federal)	14,512,966	8.35
Federal Business Development Bank	1,562,132,386	8.35
Cape Breton Development Corp.	4,200,590	8.35

Table B.2

Gross Net Yields and Rates of Return to Debt and Equity on Loan Operations for the Year Ended March 31, 1979

Agency	Net Yield	Rate of Return to Debt and Equity[1]
Newfoundland and Labrador Development Corporation	-3.86	-1.09
Prince Edward Island Lending Authority	6.06	5.82
Industrial Enterprises Incorporated (PEI)	-1.12	-1.53
Nova Scotia Resources Development Board	7.77	--
Industrial Estates Ltd. (Nova Scotia)	7.82	5.19
Financial Assistance to Industry Program (N.B.)	0.37	--
La Société de développement industriel du Québec	6.55	4.70
Ontario Development Corporation	-1.29	-4.79
Communities Economic Development Fund (Manitoba)	-.31.38	-19.9
Alberta Opportunity Company	4.49	5.15
British Columbia Development Corporation	5.05	2.42
Enterprise Development Program (Federal)	2.90	--
Federal Business Development Bank	7.09	7.49
Cape Breton Development Corporation	3.36	--

1. Rates of return to debt and equity were calculated as profits (net of loan losses) plus interest costs divided by the total of debt and equity.

Table B.3

Rates of Subsidy and Total Subsidies under the Cost Approach Implicit in Lending Activities of 14 Federal and Provincial Agencies for the year 1979
(Total Subsidy ($000))

AGENCY	ACCORDING TO CASH COST FUNDS	ACCORDING TO SOCIAL OPPORTUNITY COST OF CAPITAL OF 14.26%	ACCORDING TO SOCIAL OPPORTUNITY COST OF CAPITAL OF 16.03%	ACCORDING TO JENKINS' 18.78% NOMINAL
Newfoundland and Labrador Development Corporation	13.2% (1486)	18.1% (2043)	19.9% (2243)	22.6% (2553)
Prince Edward Island Lending Authority	4.3% (225)	8.2% (432)	10.0% (525)	12.7% (669)
Industrial Enterprises Incorporated (PEI)	11.5% (1656)	15.4% (2225)	17.2% (2481)	19.9% (2879)
Nova Scotia Resources Development Board	2.2% (1298)	6.5% (3883)	8.3% (4942)	11.0% (6588)
Industrial Estates Ltd. (Nova Scotia)	2.1% (2063)	6.4% (6238)	8.2% (7953)	11.0% (10616)
Financial Assistance to Industry Program (N.B.)	9.4% (2997)	13.9% (4438)	15.7% (5003)	18.4% (5882)
La Société de développement industriel du Québec	3.8% (3711)	7.7% (7610)	9.5% (9358)	12.2% (12072)
Ontario Development Corporation	11.2% (17963)	15.6% (25007)	17.3% (27854)	20.1% (32276)
Communities Economic Development Fund (Manitoba)	41.2% (691)	45.6% (766)	47.4% (796)	50.2% (842)
Alberta Opportunity Company	4.7% (3604)	9.8% (7556)	11.5% (8925)	14.3% (11052)

Table B.3 (Cont'd)

AGENCY	ACCORDING TO CASH COST OF FUNDS	ACCORDING TO SOCIAL OPPORTUNITY COST OF CAPITAL OF 12.74%	ACCORDING TO SOCIAL OPPORTUNITY COST OF CAPITAL OF 16.03%	ACCORDING TO JENKINS' 18.78% NOMINAL
British Columbia Development Corporation	4.9% (936)	9.2% (1752)	11.0% (2088)	13.7% (2612)
Enterprise Development Program (Federal)	5.5% (791)	11.4% (1649)	13.1% (1906)	15.9% (2305)
Federal Business Development Bank	1.3% (19683)	7.2% (112005)	8.9% (139655)	11.7% (182613)
Cape Breton Development Corporation	5.0% (210)	10.9% (458)	12.7% (532)	15.4% (648)
Total	2.7% (57314)	8.2% (176062)	9.9% (214261)	12.7% (273008)

Total subsidies are in parenthesis.

Table B.4

Calculation of Net Benefit Earned by Borrowers
of Funds from Government Agencies for the Year 1979

Agency	Gross Yield (%)	Rate of Subsidy[1] (%)	Value of Subsidy[2] ($000)
Nfld and Labrador Development	9.78	3.12	351.9
Prince Edward Island Lending Authority	9.58	3.32	174.7
Industrial Enterprises Inc. (PEI)	2.78	10.12	1464.0
Nova Scotia Resources Development Board	7.43	5.47	3272.9
Industrial Estates Ltd. (N.S.)	11.13	1.77	1714.5
Financial Assistance to Industry Program (N.B.)	7.98	4.93	1571.8
La Société de développement industriel du Québec	9.89	3.01	2971.1
Ontario Development Corporation	6.70	6.20	9970.7
Communities Economic Development Fund (Manitoba)	6.14	6.76	113.5
Alberta Opportunity Co.	9.23	3.67	2838.5
British Columbia Development Corp.	9.96	2.94	559.2
Enterprise Development Program	6.35	6.55	950.6
Federal Business Development Bank	11.32	1.58	24681.7
Cape Breton Development Corp.	10.97	1.93	81.1
Total and Average Rates	10.45	2.35	50716.2

1. Calculated as 12.90% less gross yield. Gross yield was calculated from agency reports. The ROYNAT rate of 12.90% was calculated as 2% above the chartered bank average prime rate in 1979 (Bank of Canada, Review).

2. Value of the subsidy was calculated by multiplying the rate of subsidy times average loans made by the public agency.

Bibliography

Aaron, H. (1976), Inflation and the Income Tax, The Brookings Institute, Washington, D.C.

Auerbach, A.J. (1979), "Wealth Maximization and the Cost of Capital", Quarterly Journal of Economics, 93, 433-46.

Arrow, K.J. and R.C. Lind (1970), "Uncertainty and the Evaluation of Public Investment Decisions", American Economic Review, 60, pp. 364-378.

Bank of Canada (1971), Sectoral Analysis RDXII Estimated to 4QT2, Technical Report #6, Ottawa.

Boadway, R.W. (1979), Public Sector Economics, Winthrop Publishers Inc., Cambridge, Mass.

Boadway, R., N. Bruce and J. Mintz (1981), "The Effect of Taxation on the Financing of Small and Large Businesses in Canada", Manuscript prepared for the Economic Council of Canada.

Boadway, R., N. Bruce and J. Mintz (1982), "Corporate Taxation in Canada: Towards an Efficient System", Tax Policy Options Conference, Canadian Tax Foundation, Toronto.

Boskin, M.J. (1978), "Taxation, Saving and the Rate of Interest", Journal of Political Economy, 2, 53-527.

Browning, E.K. (1976), "The Marginal Cost of Public Funds", Journal of Political Economy, 84 (2), pp. 283-298.

Burgess, D.F. (1981), "The Social Discount Rate of Canada: Theory and Evidence", Canadian Public Policy, 3, 383-94.

Harberger, A.C. (1969), "Professor Arrow on the Social Discount Rate", in G.G. Somers and W.D. Wood (eds.), Cost Benefit Analysis of Manpower Policies, Proceedings of a North American Conference, Industrial Relations Centre, Queen's University, pp. 81-88.

Jenkins, G.P. (1977), "Capital in Canada: Its Social and Private Performance 1965-1974", Discussion Paper No. 98, Economic Council of Canada, Ottawa.

_____ (1980), "Discount Rates for Economic Appraisal of Public Sector Expenditure", Canadian Public Policy, 6, pp. 549-55.

Jones, P. and S. Mason (1980), "The Valuation of Loan Guarantees", Journal of Banking and Finance, Vol. 4, 89-107.

King, M. (1977), The Corporation and Public Policy, Chapman and Hall, London.

Larkins, D. (1972), $300 Billion in Loans - An Introduction to Federal Credit Programs, American Enterprise Institute, Washington, D.C.

Malinvaud, E. (1972), "The Allocation of Individual Risks in Large Markets", Journal of Economic Theory, 9, pp. 312-318.

Marchand, M., J. Mintz and P. Pestieau (1982), "Shadow Pricing of Labour and Capital in an Economy with Unemployed Labour", CORE Discussion Paper #8235, Louvain-la-Neuve, Belgium.

Mintz, J. (1979), "Spanning, Unanimity and Financial Intermediation", Queen's University Discussion Paper No. 370.

Ogura, S. and G. Yohe, "The Complementarity of Public and Private Capital and the Optimal Rate of Return to Government Investment", Quarterly Journal of Economics, 91, pp. 651-661.

Summer, M.T., "Benefit-Cost Analysis in Canadian Practice", Canadian Public Policy, 6, 389-93.

Usher, D., "Comment on Kenneth J. Arrow's, "The Rate of Discount on Public Investments with Incomplete Markets"", unpublished manuscript, 1978.

Weidenbaum, M. (1972), Subsidies in Federal Credit Programs, Reprint No. 4, American Enterprise Institute, Washington, D.C.