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THE IMPLICIT SUBSIDY IN FEDERAL [4] BUSINESS FINANCING PROGRAMS

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The Implicit Subsidy in Federal Business Financing Programs

The federal government has for a long time maintained a variety of assistance programs for small business. The purpose of this paper is to form an estimate, for the largest of these programs, of the total subsidy to small business that results from their operation. The methodology is similar in outline to that of Mintz (1980), but with some modifications to the details of the procedure, which will be noted as they occur.

The use of the term "subsidy" may surprise those to whom it means only a direct cash payment: we use the word here to denote the provision of anything of value, any economic resource, for which no, or only partial, payment is expected. By a "partial payment" is meant any amount less than the opportunity cost of the resource provided. It is in the reckoning of this opportunity cost that most of the complexities lie. We consider the following four programs:

a) The Small Business Loans Act provides loan guarantees free of charge to qualifying small businesses. Since no fee is charged, the subsidy consists simply of the opportunity cost of the insurance provided, or in other words, the premium which a cost-recovering insuror would charge.

b) The Federal Business Development Bank makes loans to small and medium-size businesses (it also makes a few equity investments, but since the amount involved is small and little information is available, we shall ignore them). The question of a subsidy turns on whether the interest charged is sufficient to cover the opportunity cost of the loans.

c) The Enterprise Development Program provides both grants (a direct subsidy) and loan guarantees. A fee of one percent is charged for the latter, and the subsidy, if any, consists of the difference between the fee and the opportunity cost of the insurance.

d) The Small Business Development Bond program has provided, for the past two years, low-cost loans to eligible small business by, in effect, transferring the tax liability on the interest income from the lender to the borrower, who pays the small business tax rate. The recent federal budget limited eligibility for SBDB's to a small portion of the business community, and considerably reduced the tax advantage of using them, rendering the program a rather minor one. These notes will deal with the SBDB as it existed prior to the budget, and hence are of primarily historical interest. The program was active at the time the Review was begun, however, and so it was analyzed.

These four programs will be considered in detail in the following sections, each of which is more or less self-contained.

I. The Small Business Loans Act

As the SBLA charges no fee for the loan insurance it provides, the subsidy is simply the opportunity cost of the service. This cost is what a private insuror would have to charge as a premium. Suppose, for example, that

it is anticipated that two percent of the amount insured will default after two years. Then the cost is the two percent liability, discounted back to the present. The first question is, should the cost, and hence the subsidy, be assigned to the year of the loan, or the year of the default? It seems clear that ideally is should be assigned (discounted, of course) to the year of the loan, since that is when the decisions are made. Continuing the example, a two percent loss in two years time, using a ten percent discount rate, has a present cost of

$$2.0/(1+.1)^2 = 1.65 \text{ percent.}$$

Thus a premium of 1.65%, plus administrative costs, would be required to break even, and this is the subsidy in the year of the loan, under these conditions. Since loans default at various times, one would sum up the discounted expected losses in each future year to get the present value cost: hence if losses of 1.2% after one year, 2% after two years, 2.5% after three years, and 1.1% after four years are expected, then the present-value cost is

$$1.2/1.1 + 2.0/(1.1)^2 + 2.5/(1.1)^3 + 1.1/(1.1)^4 = 5.37 \text{ percent}$$

again assuming a ten percent discount rate, and this (plus administrative costs) is the premium that would be charged to break even.

There are several difficulties with applying the above procedure to the SBLA, occasioned by the meagreness of the information available. We have no figures for the loss rates anticipated at the time the loans were made, only the actual ex post payments, which include, in addition to the "intended" subsidy, the prediction error associated with the expected rates. We see no way around this problem, however, and will have to accept estimates based on ex post loss rates. If the rates change only slowly over time, which seems to be the case with the SBLA, the distortion thus introduced should be minor.

A more serious difficulty is that the SBLA administration reports only the total of claims paid in a given year: no breakdown is given of the total claims by year of loan: this makes it impossible, without further assumptions, to estimate, for each year, the proportion of loans that will eventually default. It is possible to estimate the average of this proportion over all years, but estimates of the subsidy so obtained will contain an implicit assumption of constant loss rates, which we suspect is rather risky.

For these reasons we choose to assign the cost (and hence the subsidy) to the year the claim is paid, with no discounting. This means that the subsidy in each year is simply the amount of claims paid that year, less recoveries. This is shown in table 1. Mintz divides the figure by current loans to get an approximate loss rate, but we prefer a different procedure: a recent study of the SBLA by the Department of Industry, Trade, and Commerce found that of the loans which eventually default, about 28% (by amount) do so after one year, 40% after two years, 20% after three years, and 12% after four years. This suggests dividing each year's claims paid by the weighted average of the previous four years' loans, with the above weights, to give a weighted average of the previous four years' default rates shown in table 1. This is about as close as we can come to the default rates themselves. It will be noted that the reported rates show some increase over the four years presented. As these are four-year averages, there may be more substantial increases in the rates themselves. It would

be extremely useful if the SBLA annual report could be modified to give a breakdown of claims paid each year, by year of loan.

Table 1

SBLA Subsidy

			Weights	
Loans Made:	1973	$ 32.1 million		
	1974	36.9	Lag	Weight
	1975	81.2	1	.28
	1976	90.1	2	.40
	1977	96.4	3	.20
	1978	176.3	4	.12
	1979	266.3		
	1980	408.4		

Subsidy Determination

	1977	1978	1979	1980
1. Claims Paid	632,794	1,380,584	1,788,619	3,825,688
2. Recoveries	7,287	13,808	51,633	62,036
3. Subsidy (1-2)	625,507	1,366,776	1,736,986	3,763,652
4. Weighted Average of four previous years' loans ($M)	69.0	83.7	115.7	175.2
5. Average subsidy rate, (3 ÷ 4, expressed as a percentage)	.91%	1.6%	1.5%	2.1%

Source: Weights: "SBLA Loss Rate Methodology", Working Paper, SBLA Evaluation Group, I.T.&C.
Other Data: SBLA Annual Report, 1980.

II. The Federal Business Development Bank

A. The FBDB, as a financial intermediary, borrows in the capital market and makes loans to small business. Its equity is owned entirely by the federal government. If it produces revenues which are sufficient, over the long term, to cover its costs, then there is no subsidy. Otherwise, the amount by which revenues fall short of costs constitute a subsidy by the stockholder (the government) to small business.

Revenues consist of interest paid on loans, and are relatively easy to determine, being reported in the Annual Report. Costs, in an economic (as opposed to accounting) sense are a little more complicated; they are made up of the following components:

1. Operating Costs, as given in the Annual Report.
2. Provision for losses, as given in the Annual Report.
3. Cost of debt, valued at market rates; the appropriate rate is the 5 year corporate bond rate.
4. Cost of Equity: the government's equity in FBDB amounted in 1980 to some 222 million dollars. The government, unlike a private stockholder, does not expect or demand a return on its equity holding, but nevertheless the fund has an opportunity cost which must be included in the cost of FBDB's operations.

The rate at which this opportunity cost should be assessed is the "Social Opportunity Cost", which measures the value of the public and private investment and consumption which must be foregone in order to put funds to a given use. We estimate the S.O.C. below, using the method of Mintz, with a few modifications. Since there is a certain amount of arbitrariness to the calculations, as well as to the debt-equity ratio itself in the context of a government enterprise, we give some alternatives for valuing the FBDB equity, which will be detailed below when we do the actual subsidy computations.

There are a few remarks that need to be made before proceeding to the arithmetic:

a) It might be objected that the cost of FBDB's debt should be what FBDB actually pays for it, rather than an imputed cost based on market rates of interest: FBDB has often received favourable rates in its borrowing, and using market rates seems as first to overstate the cost. The answer to this objection is that any rate advantage enjoyed by FBDB and passed on to its borrowers is part of the subsidy, since a private lender would have to charge enough to make up the extra cost of its debt. The rate advantage (in recent years, it has apparently been rather small, amounting to perhaps one-half a percentage point, according to FBDB spokemen) is an indirect cost to the taxpayers, deriving as it does from the extra security enjoyed by a government borrower: in effect the government guarantees FBDB's borrowing, which means that the taxpayers guarantee it.

   Hence FBDB's rate advantage represents, albeit indirectly, a transfer from the taxpayers to the recipients of FBDB loans' and there is no reason not to include it in the subsidy.

b) In valuing FBDB's debt and equity we have not used current rates of interest, but rather have averaged the corporate bond rates and S.O.C. over the past several years, using weights determined by FBDB's loan volume in each year. The detailed computations are at the end of this section. The reason for this procedure is that at any time the FBDB portfolio has been determined by decisions made over the previous several years, under differing economic conditions. The averaging of rates is an attempt to evaluate each decision under the conditions at the time it was made, and hence to exclude the "accidental" effects arising from the fact that no economic agent knows the future course of interest rates.

c) The tables below estimate the subsidies arising from FBDB's loan operations. In addition to loans, FBDB makes equity investments, and through its Management Services division, provides counselling on business practice. The equity invetment we have excluded from consideration for three reasons: it is a small part (about 1.2%) of FBDB's activity; there is very little information available about it; and the conceptual issues relating to implicit subsidies in the provision of equity financing are somewhat unclear. The Management Services subsidy can be added in to the loan subsidy to get the total. It amounted, in fiscal 1978, to $7.5 million; in 1979, to $11.1 million; in 1980, to $13.9 million; and in 1981, to $15.3 million.

The Social Opportunity Cost

Table 2 gives the computation of the Social Opportunity cost, generally following Mintz, but modified as follows: we use figures supplied by Burgess (1980) for the values of externalities in the labour market and in energy pricing, and we correct some apparent arithmetic errors. The source of the basic data is Industrial Corporations (Statistics Canada Cat. 61-003). This publication is based on survey data, and is timely, but is restricted to large corporations (over $10 million in assets). To see if this causes a problem, the computations were also done using, where possible, the data from Corporation Financial Statistics (Statistics Canada Cat. 61-207), which is derived from tax returns and covers all firm sizes, but for which the latest available data is 1978. It was found that the estimate of the S.O.C. derived from 61-207 was lower than that derived from 61-003 by at most about one percentage point, which is probably a reasonable estimate for the margin of error in the figures presented. All computations are carried out in nominal terms, which removes the need to devise a proxy for expected inflation. The estimates are lower than those of Jenkins (1977), who worked in real terms, by about three percentage points, for reasons outlined by Burgess (1980).

FBDB Subsidy Computation

All quantities are expressed in nominal terms. We have computed the subsidy in several different ways, corresponding to different assumptions about the role which a government lender should play. We attempt to deal only with the loans portion of the FBDB portfolio, which makes up about 98.85 of the total portfolio. Hence it is assumed that the operating costs and equity can be allocated to loans by this proportion.

For opportunity cost, we use a weighted average of past rates, the weight for each year being an estimate of the proportion of loans made in that year still remaining in the 1980 portfolio. This procedure is done for the social opportunity cost, whose unweighted value is 17.3% for 1980, and whose weighted value is 14.2%; for the corporate bond rate, whose values are respectively 13.1% and 10.6%; and for the RoyNat return on equity, whose 1980 values are 21.3% and 24.0%. The unweighted values for the corporate bond rate come from various issues of the Bank of Canada Review, specifically from the MacLeod, Young, Weir series of industrial bond rates. Since this series is an average of generally long-term bonds, and it is shorter-term bonds which are of interest here, and adjustment was made by subtracting the difference between the over-10-year government bond rate and the 3-5 year government bond rate.

Because some of the computations involve a return on equity, we have used two different leverage assumptions: the columns labelled "F" take the actual FBDB equity as given. The columns labeled "R" re-express the portfolio using the RoyNat leverage ratio: the total portfolio is left the same, and the debt and equity adjusted to the new ratio, which gives an equity for FBDB of $144.2 million in 1980.

The table is organized as follows: the net yield on loan operations is computed, excluding the opportunity cost of the equity. This is given in line 17. Then, for various alternatives for valuing the equity, the net yield is calculated which would be necessary to break even given the opportunity cost of the equity. The discrepancy between this and the actual net yield (line 17) is the subsidy.

For example, line 19 gives the net yield necessary to break even, assuming that the equity is valued at the S.O.C. The corresponding subsidy is given on line 20.

Four different assumptions are made, giving rise to the four subsidies reported on lines 20, 23, 26, and 28. They are:

a) The opportunity cost of FBDB equity is taken as the social opportunity cost. This is the alternative that seems most reasonable economically, since the S.O.C. is intended to measure the overall value to the economy of the investment and consumption foregone.

b) FBDB equity is valued at the (pre-tax) rate of return to equity of RoyNat, the private lender frequently cited as being most nearly comparable to FBDB.

c) FBDB equity is valued at the corporate bond rate. This is surely a lower bound, since normally an investor would expect a higher return from stock than from bonds; this alternative, and the next one, are included because there is some arbitrariness in the debt-equity ratio of a government agency. Valuing the equity at the corporate bond rate is, in effect, equivalent to assuming that all FBDB activity is financed through debt.

d) The other extreme of the assumption in (c) is that all FBDB activity is financed through equity. This corresponds to valuing both debt and equity at the S.O.C.

Methodology for Computing Weighted Averages of Previous Rates of Return

Let L_k be the amount of loans made in year k. If the amortization period is n years, and we assume a straight-line payback scheme, then the balance remaining after j years have passed, of the loans made in year k, is $[(n-j)/n]L_k$. The <u>average</u> balance for the (j+1)-th year of the loan is:

$$.5\left(\frac{n-j}{n} L_k + \frac{n-j-1}{n} L_k\right) = (1-1/2n - j/n)\ L_k = W_j\ L_k$$

So in year m, the fraction of the portfolio made up of loans of age i is approximately:

$$\frac{(1-1/2n - i/n)\ L_{m-i}}{\sum_{j=0}^{n-1} (1-1/2n - j/n)\ L_{m-j}}$$

These are the weights used for averaging previous rates of return.

Let C_k be the rate in year k. Then the weighted average rate in year m is:

$$\frac{\sum_{j=0}^{n-1} (1-1/2 - j/n)\ L_{m-j}\ C_{m-j}}{\sum_{j=0}^{n-1} (1-1/2n - j/n)\ L_{m-j}}$$

and the expected return in year m will be this quantity times the size of the portfolio in year m, assuming all loans are fixed-rate.

Taking n = 10 gives the coefficients $W_j = (1-1/2n-j/n) = (.95-j/10)$, so for j = 0 it is .95, sinking to .05 when j = 9. For L_k we take loan disbursements reported in the FBDB Annual Report. We take weighted averages of three rates: first, the social opportunity cost. Second, the corporate bond rate (source: Bank of Canada Review, MacLeod, Young, Weir series) modified to reflect shorter terms by subtracting the difference between the over-10-year government bond rate and the 3-5 year government bond rate; and third, the RoyNat pre-tax return on equity (source: RoyNat Annual Reports). Since loans have normally been for a five-year term, the rates are "recycled" every five years. The computations appear in tables 4, 5 and 6 for the years m = 1977, 1978, 1979 and 1980.

B. An Analysis of "Cross-Subsidization"

In 1981, after two years of losses, FBDB adopted a "Cost Recovery Plan" aimed at increasing revenues and lowering costs. We want here to examine one aspect of the program, which is the level, and sources, of subsidy that will result under full cost recovery. FBDB's use of this term differs from ours in that the cost of debt is taken to be what is actually paid, rather than the corporate bond rate, and the opportunity cost of equity is, in effect, taken to be zero. Hence it is possible for FBDB to "recover costs" in its sense of the term, and still confer a subsidy in our sense. We want to make estimates of the amount of subsidy involved in this case. Since the Plan is too new to have generated data, we must content ourselves with exploratory calculations having a good deal of hypothetical content. Nevertheless we think that the assumptions made are reasonable and the results a fair indication of magnitudes. The same method can be applied when data becomes available to yield refined estimates.

The Cost Recovery Plan uses the term "cross-subsidization" to refer to the practice of covering losses on one class of business by revenue generated from another class. For simplicity we shall divide the clientele into two classes: "winners", who generate a surplus of revenue, and "losers", on whose business losses are sustained. It is important to emphasize that these are ex ante classifications; that is, identifiable groups with certain expected costs and loss rates. Ex Post, some of the designated "winners" will turn out to be losers, and vice versa, but that does not change the argument below. The argument is changed, in addition, only in inessential details if the classification is refined to include more than two groups.

Let i^w and i^l denote the rates that would be charged to "winners" and "losers", respectively, by a private lender, say a chartered bank; and, let r^w and r^l denote the corresponding rates charged by FBDB. If we make the (somewhat unrealistic) assumption that all borrowers pay the same marginal tax rate t (which we take to be the small business rate), then the net advantage enjoyed by the borrowers from an FBDB loan is given by:

$$(1-t)\ (i^w-r^w) \text{ and } (1-t)\ (i^l-r^l).$$

Chartered Bank spokesmen have estimated that a rate advantage of one-half a percentage point would be sufficient to attract "winners" to FBDB, so we shall adopt as a rule of thumb that $i^W - r^W = .5$, and taking t = 25%, we get an advantage of (.75) (.5) = .375 percentage points for the "winners". We shall arrive at more detailed estimates $i^l - r^l$ below: for now we remark that it must surely be positive, so that a benefit is conferred by FBDB on both classes. Two questions suggest themselves: first, assuming that all costs must be covered, how much revenue must be generated from the winners to cover the losses on the losers? Second, where does the money come from?

Let
i_B = Bank's cost of borrowing
i_F = FBDB's cost of borrowing
C_B = Bank operating expense, expressed as a percentage of loans <u>including</u> expected loss rate for the given risk class
C_F = same for FBDB
A_o = the "going" after-tax return on equity for banking; this is the opportunity cost of equity funds.

<u>Then</u> we have, for each $1 of loan, and for each class of borrower;

	Bank Loan	FBDB Loan
Lender's gross receipt	i	r
Cost of debt portion of funds	$P_B i_B$	$P_F i_F$
Cost of equity portion of funds	$(1-P_B)\ A_o$	0
Net receipt before tax	$i-P_B i_B-(1-P_B)A_o-C_B$	$r-P_F i_F-C_F$
Net receipt after tax	$(1-T)(i-P_B i_B)-(1-P_B)A_o-(1-T)C_B$	$r-P_F i_F-C_F$
Tax	$T\ (i-P_B i_B-C_B)$	0
Borrower's payment	i	r
Borrower's tax	$-ti$	$-rt$
Borrower's net after-tax cost	$(i-t)i$	$(1-t)r$

Benefit to Borrower from an FBDB loan: $(1-t)\ (i-r)$

Advantage (FBDB over Bank) $r-P_F i_F-((1-T)\ (i-P_B i_B)-(1-P_B)A_o-(C_F-(1-T)C_B))$
Note that in the case of "losers", the FBDB "advantage" may be negative. We assume: t=25%, T=46%, P_B=.93, P_F=.9, C_B=C_F, i_B=18%, i_F=17.5%

Now if we consider, somewhat arbitrarily, those borrowers having a value of C_F under 4.75% as "winners" and the others as "losers", then the winners make up 55.9% of the portfolio (based on projecting the 1980 loan mix) and the losers 44.1%. The average values of C_F are:

Winners: C_F = 2.3
Losers: C_F = 10.14

We shall consider three alternative values for A_o, since it is difficult to arrive at an exact figure: the values used are 16%, 20%, and 24%.

The values for i^W and i^l are taken to be the minimum that will cover (after-tax) costs: this amounts to assuming that the private lenders are earning no uncapitalized "rents" on these loans. This gives the formula:

$i = P_B i_B + A_o(1-P_B)/(1-T) + C_B$

which yields the alternative values:

	i^W	i^l
If $A_o = .16$	21.114%	28.954%
$A_o = .20$	21.633	29.473
$A_o = .24$	22.151	29.991

So cross-subsidization allows a rate subsidy to the losers of around seven percentage points, while remaining on "cost-recovery".

Finally, we need an estimate of the FBDB rates r^W and r^l. The first comes from the above mentioned rule of thumb that "winners" loans will be, on average, half a percentage point below the market rates: this gives

$r^W = i^W - .5 =$ 20.614 % if $A_o = .16$
21.133 if $A_o = .20$
21.651 if $A_o = .24$

To determine an estimate for r^l, we use the "cost-recovery" constraint: that is, we determine r^l so that the losses on the "loser" business are just balanced by the gains on the "winners". This amounts to requiring that

$$.559\ (r^W - P_{Fi_F} - C^W) + .441\ (r^l - P_{Fi_F} - C^l) = 0$$

which in turn yields:

$$r^l = C^l + P_{Fi_F}/.441 - .559\ (r^W - C^W)/.441.$$

Substituting the values above gives

$r^i =$ 22.64% if $A_o = .16$
21.98% if $A_o = .20$
21.33 if $A_o = .24$

These calculations, it should be noted, depend on the assumptions outlined above, specifically

1. FBDB operating costs are approximately in line with those of private lenders, for the same class of borrower. To the extent that they are higher, r^l would have to be increased by the difference in order to stay on "cost recovery".

2. The private lender's rates include no uncapitalized rent. If there is uncapitalized rent being earned, say at the rate of q (i.e. the rate i is given by $i = P_B + C_B + A_o\ (1-P_B)/(1-T) + q$), then the cost recovery value of r^l is decreased by $q\ (.559/(.441) = 1.268\ q$, if all the rent is passed on to the "losers". If the rent is shared equally between winners and losers then both r^W and r^l are decreased by q. Alternatively, the ratio of losers to winners can be increased.

3. The share of winners and losers in the portfolio remains at .550 and .441 respectively. Obviously if these shares change the calculations will have to be revised accordingly.

4. All borrowers pay the small business tax rate at the margin.

Under the assumption above, we can work out the total advantage to FBDB customers as:

Winners: (.5) (1-t) = .375 percentage points.

Losers: (28.054 - 22.640)(1-t) = 4.75 percentage points (if A_o = .16)
(29.473 - 21.98)(1-t) = 5.62 percentage points (if A_o = .20)
(29.991 - 21.33)(1-t) = 6.50 percentage points (if A_o = .24)

So the total advantage is the weighted average:

2.30 percentage points, if A_o = .16
2.69 percentage points, if A_o = .20
3.08 percentage points, if A_o = .24

Taking A_o = .20, on a portfolio of $2 billion this gives a total subsidy of $53.8 million. We shall now detail the sources of this subsidy.

In the first above section we worked out formulas for the advantage to the borrower and to FBDB from an FBDB loan. They are:

Borrower: $(1-t)(i-r)$
FBDB: $r-P_F i_F-C_F - [(1-T)(i-P_B i_B-C_B) - (1-P_B) A_o]$

If we sum these, and take the weighted average over winners and losers, we will get the same total subsidy as above. Adding the two lines, and then rearranging the terms, we have:

$$(i-t)(i-r)+r-P_F i_F-(1-T)(i-P_B i_B)+(1-P_B)A_o-(C_F-(1-T)C_B)$$

$= T(i-P_B i_B-C_B)$ forgone tax on interest income of private lender
$+ (1-P_B)A_o$ foregone return to equity
$+ (P_B i_B-P_F i_F)$ advantage in cost of borrowing
$- t(i-r)$ extra tax paid by borrower
$- (C_F-C_B)$ difference in operating cost and loss rates

Continuing the assumption that FBDB and private operating costs are comparable, the last term becomes zero, and we get the following breakdown, assuming A_o = .20:

Total Subsidy By Source (A_o = .20)

	Winners	Losers	Weighted Average
Foregone tax	1.19	1.19	1.19
Foregone Equity Return	1.40	1.40	1.40
Borrowing Advantage	.99	.99	.99
Extra tax by borrower	-.125	-1.87	- .89
Total	3.46	1.71	2.69

The positive entries in each column total 3.58, and we can give a breakdown of the FBDB advantage as:

Foregone tax	1.19/3.58 = 33%
Foregone return on Equity	1.40/3.58 = 39%
Borrowing advantage	.99/3.58 = 28%

Different values of A_o will, of course, yield different relative weights, but the broad picture remains more or less the same: that, at least with the assumptions made above the three advantages that FBDB has over private lenders (the three sources of its subsidy) make an approximately equal contribution to the total subsidy. All of these sources are direct or indirect costs to taxpayers. The foregone tax on the private lender's interest income is a direct tax expenditure. The foregone return to equity represents, in effect, the government's forcing the taxpayers to buy stock which yields no return: the cost to the taxpayer is then the opportunity cost of the funds, which may be taken either as the social opportunity cost or as the (after-tax) average rate of return to equity in private markets. The advantage (if any) in FBDB's borrowing rates derives from its status as a government agency, and as argued above this is an indirect cost to the taxpayers. Hence all of the sources of the FBDB cross-subsidization funds are ultimately costs to the taxpayers.

Enterprise Development Program (EDP) Loan Insurance

The EDP is the result of a consolidation, in 1977, of several previous assistance programs; as such, it has a relatively long history, but the discontinuity caused by the formation of EDP in 1977 makes difficult any comparison of present with previous data. What we have done instead is to summarize one of the predecessor programs, the General Adjustment Assistance Program (GAAP), and the insured loan program of EDP for 1977-80. Because of the shortness of the time period involved and the time-lags inherent in a default insurance program, we have not attempted a year-by-year breakdown, but treat the period as a whole. Table 7 gives the results. The first part treats the entire GAAP program from 1968 to 1977, with later claims arising from GAAP - authorized loans attributed to GAAP, rather than to EDP. As no figures were available on actual loans as opposed to authorization, the EDP take-up rate was used. The EDP table, Table 8,covers activity through Aug. 1, 1981. It gives claims paid, accounts in formal demand or receivership with estimated losses, and accounts which have been identified as "problems", with estimated eventual losses. (These figures were prepared by the Programs Branch of the Department of Industry, Trade and Commerce.) Since EDP has been in a start-up situation for most of the period covered, the actual net loss rate is probably an underestimate of the eventual "steady-state" loss rate, because there is a time-lag between the granting of a loan and its default.

Thus we have used the actual losses plus estimated losses from receiverships and problem accounts as an

approximation to the true ex ante loss rate: this is given in line 9; it may be taken as indicative of the subsidy rate involved in EDP loan insurance.

Table 7

GAAP PROGRAM	1968-1977
1. Authorizations	$299.9 million
2. EDP Take-up rate	65%
3. Estimated GAAP Loans	194.9 million
4. Claims Paid	28.7
5. Less: Recoveries	1.3
6. Net Claims	27.4
7. Less: Fees Collected	4.0
8. Net Loss	23.4
9. Net Loss as % of Loans	12%

Souce: EDP First Annual Review

Table 8

EDP Program, April 1, 1977 to August 1, 1981

($ millions)

	Regional	Central	Total
1. Authorizations	31.3	415.2	446.5
2. Insurance Contracted	18.1	247.2	265.8
3. Claims Paid or Formal Demand	5.4	23.0	28.4
4. Estimated Losses from Identified Problems (August 1, 1981)	.8	56.4	57.2
5. Total	6.2	79.4	85.2
6. Less Fees (Est)	.3	2.7	3.0
7. Less Options (Electro-home, etc.)			12.0
8. Net Loss (=Subsidy)			70.6
9. Loss Rate (8 - 2)			26.6%

Small Business Development Bonds (SBDB)

The SDBD program as originally constituted was in place for only two years, and has generated no useful data; what little information we have was obtained verbally from chartered bank spokesmen. So we will again have to content ourselves with exploratory calculations. An SBDB is a specially - designated loan having the property that the lender pays no tax on the interest income, and the borrower is unable to deduct interest expense payments for tax purposes. The tax on the interest is then paid at the Small Business rate. The bank, receiving the interest tax-free, has an incentive to offer attractive interest rates, low enough to compensate the business for the extra tax paid. To see how it works, we consider the situation with and without the SBDB:

First consider the situation without an SBDB. A business loan at interest rate i produces, for each dollar lent (for each year of the loan)

Bank before-tax receipt	i
Bank after-tax receipt	i(1-.46) = .54i
Borrower before-tax payment	i (deductible)
Borrower net-of-tax payment	i (1-.25) = .75i

The tax collected is .46i minus the deduction allowed the borrower, i.e. tax = .46i - .25i = .21i. This is the tax "wedge" made available by the SBDB.

Now consider the same loan made under SBDB at interest rate r. The Bank's after-tax receipt and the borrowers after-tax payment is r. So the bank gains r -.54i, and the borrower loses r -.75i. the net gain is (r-.54i) - (r.75i) = .21i, the tax wedge. This is the amount of the SBDB subsidy, per dollar of loan volume, per year. Note that it is independent of the rate r actually charged for the SBDB loan, but depends only on i, the rate that would have been charged on the loan without SBDB. If we guesstimate this at prime plus 2, and assume program volume of about $400 million in loans, then using the December 1980 prime rate figure of 18.25%, (giving i = 18.25 + 2 = 20.25%), we get a total subsidy of (.21) (.2025) (400,000,000) = $17.01 million per year.

If we assume that the banks and the borrowers split the subsidy evenly, this requires a rate r = .645i, which in this case is 13.1% and the actual subsidy to small business is $8.93 million (ie half of $17.85 million); the balance of the subsidy goes to the lender.

It appears, however, that in practice the subsidy is not split evenly. Banks differ in their methods of determining r, but the formula "one-half prime plus two" was a common one. For a "prime plus one" borrower, the bank's share of the subsidy under this formula is 14.9%. and the borrower's share 85.1%. A "prime plus two" borrower, under the same formula, receives 97.4% of the subsidy.

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Table 2 (A)

Social Opportunity Cost

	1973	1974	1975	1976
1. Interest Yield on Bonds	8.47	10.16	10.76	10.48%
2. Before tax return to Equity	21.6	25.5	21.8	19.5
3. Share of Assets financed by:				
Debt	55%	55%	55%	55%
Retained Earnings	35%	35%	35%	35%
New Equity Issues	10%	10%	10%	10%
4. Before Tax Return on Investment	14.4	17.1	15.7	14.5
5. After tax return to Equity	13.8	15.1	13.0	11.7
6. Effect of $1000 Exemption	.15	.15	.15	.15
7. Average Personal Tax on Corporate Bonds	36%	36%	36%	36%
8. Average Personal Tax on Accrued Capital Gains	17%	17%	17%	17%
9. Average Personal Tax on Dividends after Tax Credit	17%	17%	17%	17%
10. After tax rate of return to Domestic Saving	8.14	9.22	8.64	8.06
11. Canadian withholding rate on foreign earnings	15%	15%	15%	15%
12. Proportion of Income received as: Interest	40%	40%	40%	40%
Dividends	60%	60%	60%	60%
13. After Canadian tax rate of return to foreign Saving	9.92	11.16	10.29	9.65
14. Labour Externality rate	.0525	.0525	.0525	.0525
15. Under Pricing of Energy Ext. rate	-.04	-.04	-.04	-.04
16. Net Social rate of return on Industrial Investment	14.6	17.3	15.9	14.7
17. Social Cost of Incremental Foreign Financing	.1429	.1429	.1429	.1429
18. Social After-Tax Return to Foreign Saving	11.34	12.75	11.76	11.03
19. Weights:				
Industrial Investment	.45	.45	.45	.45
Domestic Saving	.15	.15	.15	.15
Foreign Saving	.40	.40	.40	.40
20. Social Opportunity Cost of Government Funds	12.3	14.3	13.2	12.4

Sources:

Industrial Corporations 61-003 (Quarterly) Statistics Canada

"The Social Discount Rate for Canada; Theory and Measurement"
D.F. Burgess, Energy Mines and Resources Canada Special Study 1980.

Table 2 (B)

Social Opportunity Cost

	1977	1978	1979	1980
1. Interest Yield on Bonds	9.71%	10.02	10.88	13.24
2. Before tax return to Equity	20.2%	22.0%	28.3%	26.9%
3. Share of Assets financed by:				
Debt	55%	55%	55%	55%
Retained Earnings	35%	35%	35%	35%
New Equity Issues	10%	10%	10%	10%
4. Before Tax Return on Investment	14.3	15.4	18.7	19.4
5. After tax return to Equity	11.9	13.5	17.4	16.4
6. Effect of $1000 Exemption	.15	.15	.15	.15
7. Average Personal Tax on Corporate Bonds	36%	36%	36%	36%
8. Average Personal Tax on Accrued Capital Gains	17%	17%	17%	17%
9. Average Personal Tax on Dividends after Tax Credit	17%	17%	17%	17%
10. After tax rate of return to Domestic Saving	7.9	7.9	9.6	9.9
11. Canadian withholding rate on foreign earnings	15%	15%	15%	15%
12. Proportion of Income received as: Interest	40%	40%	40%	40%
Dividends	60%	60%	60%	60%
13. After Canadian tax rate of return to foreign Saving	9.4	10.3	12.6	15.1
14. Labour Externality rate	.0525	.0525	.0525	.0525
15. Under Pricing of Energy Ext. rate	-.04	-.04	-.04	-.04
16. Net Social rate of return on Industrial Investment	14.5	15.6	18.9	19.6
17. Social Cost of Incremental Foreign Financing	.1429	.1429	.1429	.1429
18. Social After-Tax Return to Foreign Saving	10.7	11.8	14.4	17.3
19. Weights:				
Industrial Investment	.45	.45	.45	.45
Domestic Saving	.15	.15	.15	.15
Foreign Saving	.40	.40	.40	.40
20. Social Opportunity Cost of Government Funds	12.0	12.9	15.5	17.3

Sources:

Industrial Corporations 61-003 (Quarterly) Statistics Canada
"The Social Discount Rate for Canada; Theory and Measurement"
D.F. Burgess, Energy Mines and Resources Canada Special Study 1980.

Table 3

FBDB Subsidy (millions)
Fiscal Year Ending March 31:

		1978		1979		1980		1981	
		F	R	F	R	F	R	F	R
1.	Weighted Social Opportunity Cost	12.7%		12.7%		13.6%		14.3%	
2.	Weighted Corporate Bond Rate	8.9%		9.2%		10.3%		10.6%	
3.	FBDB Loans and Investment	1493.3		1657.5		2048.6		2072.7	
4.	Loans	1481.6		1638.9		2025.7		2046.9	
5.	Equity	122.0	104.5	136.0	116.0	184.0	143.2	222.0	145.0
6.	Portion of Equity allocated to loans (98.8%)	120.5	103.2	134.4	114.6	181.8	141.5	219.3	143.3
7.	Capital raized by debt	1371.3	1388.9	1521.5	1541.6	1864.6	1905.4	1850.7	1927.8
8.	Imputed cost of debt at corporate bond rate (weighted)	122.0	123.6	140.0	141.8	192.1	196.3	196.2	204.3
9.	Operating Expenses	49.6		52.5		63.7		66.7	
10.	Provision for Losses, less recoveries	19.3		18.1		43.2		60.0	
11.	Total Cost (7 + 8 + 9)	190.9	192.5	210.6	212.4	299.0	303.2	322.9	331.0
12.	Portion allocated to Loans (98.8%)	188.7	190.2	208.1	209.9	295.4	299.6	319.0	327.0
13.	Interest on Loans and Treasury Bills	167.1		177.1		216.4		260.1	
14.	Treasury Bill Holdings	31.14		3.10		4.23		35.9	
15.	Treasury Bill interest rate	7.33%		8.68%		11.69%		12.79%	
16.	Interest on Loans	164.8		176.8		215.9		255.5	
17.	Net Yield on Loans (16-11)	-23.9	-25.4	-32.4	-34.2	-79.5	-83.7	-63.5	-71.5
18.	Social Opportunity Cost (Weighted)	12.7%		12.7%		13.6%		14.3%	
19.	Net Yield needed to realize S.O.C. on Loan Portion of Equity	15.3	13.1	17.1	14.6	24.7	19.2	31.4	20.5
20.	Discrepancy = Subsidy (19-17)	39.2	38.5	49.5	48.8	104.2	102.9	94.9	92.0

Table 3 (Cont'd)

FBDB Subsidy (millions)
Fiscal Year Ending March 31:

		1978		1979		1980		1981	
		F	R	F	R	F	R	F	R
21.	Roy Nat's Before-tax R.O.E (Weighted)	24.7%		25.2%		24.9%		24.2%	
22.	Net Yield needed to realize Roy-Nat's R.O.E. on Loan Portion of Equity	29.8	25.5	33.9	28.9	45.3	35.2	53.1	34.7
23.	Discrepancy = Subsidy (22-17)	52.7	50.9	66.3	63.1	124.8	118.9	116.6	106.2
24.	Corporate Bond Rate (Weighted)	8.9%		9.2%		10.3%		10.6%	
25.	Net Yield needed to realize Corporate Bond Rate on Loan Portion of Equity	10.7		12.4		18.7		23.2	
26.	Discrepancy = Subsidy (25-17)	34.6		44.8		98.2		88.7	
27.	Net Yield needed to realize S.O.C. on all assets	63.9		70.4		86.2		99.9	
28.	Discrepancy = Subsidy (27-17)	86.8		102.8		165.7		163.4	

Table 4
Social Opportunity Cost, unweighted

1980	17.3
1979	15.7
1978	12.9
1977	12.0
1976	12.4
1975	13.2
1974	14.3
1973	12.3
1972	11.5
1971	10.5

m = 1977			m = 1978			m = 1979			m = 1980		
$W_j L_{m-j}$	C_{m-j}	$W_j L_{m-j} C_{m-j}$	$W_j L_{m-j}$	C_{m-j}	$W_j L_{m-j} C_{m-j}$	$W_j L_{m-j}$	C_{m-j}	$W_j L_{m-j} C_{m-j}$	$W_j L_{m-j}$	C_{m-j}	$W_j L_{m-j} C_{m-j}$
372.0	12.0	4464.0	472.8	12.9	6099.1	620.3	15.7	9738.7	379.7	17.3	6568.9
314.0	12.4	3893.6	332.9	12.0	3994.8	423.0	12.9	5456.7	617.6	15.7	9696.3
297.7	13.2	3929.6	277.1	12.4	3436.0	293.7	12.0	3524.4	373.3	12.9	4815.6
231.9	14.3	3316.2	242.4	13.2	3199.7	240.1	12.4	2977.2	254.5	12.0	2946.0
222.7	12.3	2739.2	196.2	14.3	2805.7	205.1	13.2	2707.2	203.2	12.4	2519.7
123.7	11.5	1422.6	182.2	12.3	2241.1	160.5	14.3	2295.2	167.8	13.2	2215.0
67.9	12.4	842.0	96.2	12.0	1154.4	141.7	12.9	1829.9	124.8	15.4	1959.3
39.1	13.2	516.1	48.5	12.4	601.4	68.7	12.0	824.4	101.2	12.9	1305.0
22.7	14.3	324.6	23.4	13.2	308.9	29.1	12.4	360.8	41.2	12.0	494.4
6.1	12.3	75.0	7.6	14.3	108.7	7.8	13.2	103.0	9.0	12.4	111.6
1697.8		21522.9	1879.4		23949.8	2190.0		29817.5	2272.3		32614.8

$$\frac{21522.9}{1697.8} = 12.7 \qquad \frac{23949.8}{1879.4} = 12.7 \qquad \frac{29817.5}{2190.0} = 13.6 \qquad \frac{32614.8}{2272.3} = 14.3$$

Table 5
RoyNat R.O.E.

	Assets	Equity	Gross Rev.	Expenses (incl. interest)	Net Revenue	R.O.E.
1980	744.5	51.6	89.5	78.5	11.0	21.3
1979	618.3	48.1	70.6	59.3	11.3	23.5
1978	555.1	44.6	63.1	51.4	11.7	26.2
1977	478.7	40.8	54.8	44.3	10.5	25.7
1976	413.1	34.8	44.2	35.7	8.5	24.4
1975	298.2	22.1	31.5	25.9	5.6	25.3
1974	233.9	20.6	22.9	17.9	5.0	24.3
1973	184.8	19.2	19.5	14.9	4.6	24.0
1972	162.9	17.5	17.2	13.1	4.1	23.4

m = 1977			m = 1978			m = 1979			m = 1980		
$W_j L_{m-j}$	C_{m-j}	$W_j L_{m-j} C_{m-j}$	$W_j L_{m-j}$	C_{m-j}	$W_j L_{m-j} C_{m-j}$	$W_j L_{m-j}$	C_{m-j}	$W_j L_{m-j} C_{m-j}$	$W_j L_{m-j}$	C_{m-j}	$W_j L_{m-j} C_{m-j}$
372.0	25.7	9560.4	472.8	26.2	12387.4	620.3	23.5	14577.1	379.7	21.3	8087.6
314.0	24.4	7661.6	332.9	25.7	8555.5	423.0	26.2	11124.9	617.6	23.5	14513.6
297.7	25.3	7531.8	277.1	24.4	6761.2	293.7	25.7	7548.5	373.3	26.2	9780.5
231.9	24.3	5635.2	242.4	25.3	6132.7	240.1	24.4	5858.4	254.5	25.7	6540.7
222.7	24.0	5344.8	196.2	24.3	4767.7	205.1	25.3	5189.0	203.2	24.4	4958.1
123.7	23.4	2894.6	182.2	24.0	4372.8	160.5	24.3	3900.2	167.8	25.3	4245.3
67.9	24.4	1656.8	96.2	25.7	2472.3	141.7	26.2	3712.5	124.8	23.5	2932.8
39.1	25.3	989.2	48.5	24.4	1183.4	68.7	25.7	1765.6	101.2	26.1	2641.3
22.7	24.3	551.6	23.4	25.3	592.0	29.1	24.4	710.0	41.2	25.7	1058.8
6.1	24.0	146.4	7.6	24.3	184.7	7.8	25.3	197.3	9.0	24.4	219.6
1697.8		41972.4	1879.4		47409.3	2190.0		54583.5	2272.3		54978.3

$$\frac{41972.4}{1697.8} = \underline{\underline{24.7}} \qquad \frac{47409.3}{1879.4} = \underline{\underline{25.2}} \qquad \frac{54583.5}{2190.0} = \underline{\underline{24.9}} \qquad \frac{54978.3}{2272.3} = \underline{\underline{24.2}}$$

Table 6
Corporate Bond Rate

1980	13.1
1979	11.1
1978	9.8
1977	8.8
1976	9.6
1975	9.4
1974	9.4
1973	7.9

m = 1977			m = 1978			m = 1979			m = 1980		
$W_j L_{m-j}$	C_{m-j}	$W_j L_{m-j} C_{m-j}$	$W_j L_{m-j}$	C_{m-j}	$W_j L_{m-j} C_{m-j}$	$W_j L_{m-j}$	C_{m-j}	$W_j L_{m-j} C_{m-j}$	$W_j L_{m-j}$	C_{m-j}	$W_j L_{m-j} C_{m-j}$
372.0	8.8	3273.6	472.8	9.8	4633.4	620.3	11.1	7655.7	379.7	13.1	4974.1
314.0	9.6	3014.4	332.9	8.8	2929.5	423.0	9.8	4145.8	617.6	11.1	6855.4
279.7	9.4	2629.2	277.1	9.6	2660.2	293.7	8.8	2584.6	373.3	9.8	3658.3
321.9	9.4	2179.9	242.4	9.4	2278.6	240.1	9.6	2305.1	254.5	8.8	2239.6
222.7	7.9	1759.3	196.2	9.4	1844.3	205.1	9.4	1927.9	203.2	9.6	1950.7
123.7	7.5	927.8	182.2	7.9	1439.4	160.5	9.4	1508.8	167.8	9.4	1577.3
67.9	9.6	651.8	96.2	8.8	846.6	141.7	9.8	1388.8	124.8	11.1	1385.3
39.1	9.4	367.5	48.5	9.6	456.6	68.7	8.8	604.8	101.2	9.8	991.8
22.7	9.4	213.4	23.4	9.4	220.0	29.1	9.6	279.4	41.2	8.8	362.6
6.1	7.9	48.2	7.6	9.4	71.4	7.8	9.4	73.3	9.0	9.6	86.4
1697.8		15067.1	1879.4		17380.0	2190.0		22474.2	2272.3		24081.4

$$\frac{15065.1}{1697.8} = \underline{\underline{8.9}} \qquad \frac{17380.0}{1879.4} = \underline{\underline{9.2}} \qquad \frac{22474.2}{2190.0} = \underline{\underline{10.3}} \qquad \frac{24081.4}{2272.3} = \underline{\underline{10.6}}$$