The Canadian Journal of Regional Science/
La Revue Canadienne des Sciences Régionales IV, 2 (1981). © IPA 1981

THE INTERACTION OF FEDERAL AND TERRITORIAL INCOME TAX RATES
THE CASE OF THE NORTHWEST TERRITORIES*

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Introduction

Although the potential for oil and gas development has increased the attention given to the Northwest Territories (N.W.T.), many of their problems are still poorly understood. This is due in part to the paucity of data and in part to the relatively small amount of research which is applicable to the N.W.T. This lack of understanding extends to the problems of the Government of the Northwest Territories (G.N.W.T.) which is unique in several respects.

The G.N.W.T. receives sixty-nine percent of its revenue as an unconditional fiscal transfer from the federal government.[1] Simultaneously, the G.N.W.T. imposes the second lowest personal income tax in Canada (43%) and shares with Alberta the distinction of having no retail sales tax.[2] The combination of high fiscal dependency and low territorial tax rates is anomalous in Canada. The Atlantic Provinces, which are also fiscally dependent on the federal government, impose differentially high personal income and retail

*Thanks are due to E. Nielsen and J. A. Gray for helpful comments on an earlier version of this paper.

[1]For the Budget year 1980-81, total income of the Government of the Northwest Territories is estimated at $307,701,000. The fiscal transfer from the federal government is composed of $155,542,000 for operating expenditures and $59,463,000 for capital expenditures. These grants do not include a myriad of special financial arrangements with respect to the Dempster Highway, health care for native people, and payments under Established Program Financing. See [11].

[2]The Yukon Government also imposes a 43 percent territorial personal income tax. As of June 1, 1980, Alberta imposed a 38.5 percent personal income tax and Ontario and British Columbia imposed 44 percent personal income taxes. See [4: Table 12].

sales tax rates on their residents.[3] The N.W.T. would seem to be undertaxed, and, in fact, the Department of Indian Affairs and Northern Development has made this observation [8]. If this claim is true, the rationale for the existing level of federal assistance to the G.N.W.T. is questionable.

Whether the N.W.T. is undertaxed is a question which should be answered in its own right. The question becomes more interesting and potentially more important for the provinces, however, when the methodological framework to answer the question is developed. The framework requires explicit recognition of the differentially high cost of living in the N.W.T. The Drury Report [9:113] recognizes that the high cost of living in the N.W.T., combined with a progressive federal income tax structure results in higher effective tax rates in the North.[4] However, it makes no attempt to document the magnitude of the tax distortion and no attempt to consider the implications of federal taxation for the tax potential of the G.N.W.T. It appears that the interaction between federal and territorial tax rates is preceived poorly and that there is no empiriical work on the importance of this interaction.

In this paper, we will examine the impact of the differentially high cost of living in the N.W.T. on the income tax structure: increasing the real rates of federal income taxation on Northerners relative to other Canadians. Our hypothesis is that the higher effective rate of federal taxation may have constrained the G.N.W.T. in the income tax field and thus affected their ability to impose a retail sales tax. The preliminary results indicate that the effective burden of the federal income tax is greater than on other Canadians. Furthermore, if the burden of federal taxation were not greater, the G.N.W.T. could increase its personal income tax to 58 percent, equal to the income tax rate in Newfoundland, which is the highest rate in the country. Additionally, there would still be enough tax room for the G.N.W.T. to also institute a 1 percent retail sales tax without increasing the total tax burden on residents of the N.W.T. We examine the incidence of such a tax substitution and conclude with some observations on federal-territorial finiancial arrangements.

[3]For example, Newfoundland received 47 percent of gross general revenue from the federal government in 1977-78. Currently, Newfoundland imposes a 58 percent personal income tax and an 11 percent retail sales tax. See [4].

[4]The Drury Report recognizes that a higher cost of living means higher federal taxes for similarly situated individuals in the N.W.T. relative to Edmonton. This is true, although comparisons with Alberta tax burdens normally recognize the differentially low provincial tax rates in Alberta.

A Basis for Transfers to the N.W.T.

There are a number of rationales for transfers between governments, and indeed the recent interest in federal-provincial financial relations has focused attention in this area [2]. There are a number of specific transfers to the N.W.T. which may be justified on the basis of externalities or special circumstances. The major federal transfer, however, is in the form of an unconditional grant which may be justified by the principle of fiscal equity. It would be incorrect to claim that there is a consensus on the philosophical basis for transfers, but in our view the principle of fiscal equity is a consistant and defensible rationale for unconditional transfers.[5]

The principle of fiscal equity is that governments should be able to provide comparable individuals with comparable levels of public services while imposing comparable tax burdens, regardless of where the individual chooses to live in the country. More accurately, the principle of fiscal equity applies to individuals in similar circumstances and does not require that all governments provide the same level of public services. Different parts of a federation may choose to provide different levels of a different composition of public services, but each should have the financial capacity to provide comparable individuals with comparable services levels.

The principle of fiscal equity is justified on both ethical and economic efficiency grounds. The ethical foundation is identical to the rationale for horizontal equity familiar to students of taxation. The economic efficiency argument is that resources should be located in a country where their net social productivity is greatest. Fiscal equity ensures that resources do not move because of differential resource endowment unless their net social product will be greater in the new location. In a slightly different context, this argument has been developed in critiques of the Tiebout hypothesis [3;10].

The principle of fiscal equity can be applied to the Northwest Territories but it is important to recognize that differential cost-of-living implies that the same real income as in southern Canada will imply a higher money income in the N.W.T. Equality of tax burdens for comparable individuals means equality of real tax burdens. This implies that nominal taxes will be higher for individuals in the N.W.T. relative to comparable individuals elsewhere. Alternatively, equality of real taxes can be interpreted as equality of tax rates for comparable individuals in the N.W.T. and elsewhere. In this formulation, tax rates are the sum of federal and territorial tax rates, so that a combination of high federal and low territorial tax rates can

[5]For a recent defense of the fiscal equity rationale see Graham [14]. The Graham comment is on Courchene and Copplestone [6].

yield the same result as low federal and high territorial tax rates. If, then, federal tax rates are higher in the N.W.T. than in southern Canada, for comparable levels of real income, territorial tax rates must be lower than provincial tax rates on the same real income.

We do not claim that the principle of fiscal equity is the guiding principle behind the choice of tax rates and intergovernmental transfers; however, it does seem to be an appropriate basis on which to develop the transfers. No further consideration is given to this basis except to note that the problems of measuring expenditure, benefit and tax incidence may preclude precise estimates of net fiscal burdens even if incidence theory suggested a unique manner in which the burdens should be distributed. Accordingly, we have adopted a differential incidence framework by substituting territorial income taxes for federal income taxes to the degree we think practicable. This reduces the incidence problems. Furthermore, it permits a comparison with provincial income tax rates, and so gives a general indication of whether fiscal equity would justify a change in the real federal transfer to the N.W.T.

The Impact of Northern Costs on the Tax Structure

There are no comprehensive estimates of the cost of living differential between the Northwest Territories and the rest of Canada. It is reasonable to suspect that the combination of small population (46,000), large land mass (1/3 of Canada's area), population dispersion, distance from southern population centres, and the harsh climate will increase the cost of importing and distributing many types of goods. Some crude cost comparisons have been made. The Department of Indian Affairs and Northern Development [7:10] notes that the per capita costs of the G.N.W.T. are 179 percent of the Canadian average, but not attempt is made to isolate the factors responsible for the differential. The Drury report [9:113] notes that the cost of living allowances for federal employees in the N.W.T. range from 25 to 90 percent and typically fall around 50 percent. The only attempt to document cost of living differentials is a recent study by the G.N.W.T. [13] which compares the cost of living in Yellowknife and Edmonton as of June 1980.[6] The Yellowknife index is estimated at 125.9 which accords well with the minimum of the range cited by the Drury report. This seems reasonable, since Yellowknife appears to be at the bottom of the range for the northern communities examined in this study. However, the Yellowknife index is not likely to be applicable to all of the N.W.T. and, in any event, Edmonton is not typical of Canada.

[6]Unfortunately, this survey uses Edmonton weights in the index, which biases the index for Yellowknife upward.

We attempted to gather cost indices for some N.W.T. communities other than Yellowknife. However, very little research has been done in this area. The costs of two goods, electricity and food, have been collected for some communities and the available information is presented in Tables 1 and 2. This suggests that the cost of living is significantly higher in many commnities compared to Yellowknife, but the information is seriously incomplete. It is not possible to construct cost of living indicies on the basis of such limited data. In order to complete this study, it is necessary to make some assumption about the cost of living in the N.W.T. relative to southern Canada. We have assumed the cost of living differential is 50 percent, which is the typical allowance for federal employees cited by

Table 1

DIFFERENTIAL COST OF ELECTRICITY IN N.W.T. COMMUNITIES APRIL 1978 - MARCH 1979

Community and Type of Residence*	Electricity Consumption per 1000 sq. ft. (in KWH)	Electricity Costs at: Yellowknife Rates	Electricity Costs at: Domestic Rates
Yellowknife			
User pay residences			
Sample #1	7,500	$ 381.22	$ 381.22
Sample #2	8,450	425.73	425.73
Rankin Inlet			
GNWT Staff residences	12,874	636.53	3,089.76
Private subsidized	13,980	680.61	3,303.88**
Private user pay	6,045	310.53	1.507.18**
Frobisher Bay			
GNWT staff residences	10,057	502.70	1,488.44
Private subsidized	49,333	2,339.94	6,928.24**
Private user pay	7,343	372.70	1,103.53**
Inuvik			
GNWT staff residences	14,380	709.77	1,624.94
Private subsidized	17,642	866.08	1,982.75**
Private user pay	8,789	441.96	1,011.85**

* The sample size for Yellowknife is unknown. The sample sizes for the other communities range from one to twenty observations.

** Domestic estimates not available in the original source.

Source: *Task Force On Employee Housing, 1979* (Yellowknife: G.N.W.T., 1978).

the Drury Report. However, we remain acutely sensitive to the diversity of costs of living across the N.W.T. and to the paucity of data in general. Accordingly, we caution the reader that this 50 percent cost of living differential is not precise but we believe it is illustrative of the problem that cost of living differentials raise for residents of the N.W.T. A detailed examination of the issues raised in this paper will require a more accurate survey of cost of living differentials.

Cost of living variations distort the effective tax rates under the progressive income tax structure. It is reasonable that all Canadians should be subject to the same federal tax rates regardless of where they live in the country. The basic issues involved are similar to those addressed in the discussion over indexing the personal income tax in Canada [1] since inflation distorts the real structure of the income tax inter-temporally while a differential cost of living distorts the structure geographically. Inflation increases the real tax burden most dramatically on individuals with the largest personal exemptions relative to gross income. These individuals are those with the lowest incomes and largest number of dependents [18]. Indexing the progressive personal income tax is one way of ensuring that real tax burdens do not change unless modified explicitly by Parliment.

Table 2

DIFFERENTIAL FOOD ALLOWANCES UNDER SOCIAL ASSISTANCE IN SELECTED N.W.T. COMMUNITIES, APRIL 1978

Community	Monthly Food Allowance		Food Costs as a Percent of Food Costs in	
	Family Size	Total	Yellowknife	Edmonton
	#	$	%	%
Yellowknife	2	167	100.00	121.3
	6	386	100.00	121.3
Inuvik	2	209	125.2	151.8
	6	483	125.1	151.8
Frobisher Bay	2	225	134.7	163.4
	6	521	135.0	163.7
Rankin Inlet	2	225	134.7	163.4
	6	521	135.0	163.7
Port Inlet	2	242	144.9	175.8
	6	560	145.1	176.0

Source: Unpublished information on Social Assistance provided by the Director of Social Assistance for the Northwest Territories; and [13].

The Canadian personal income tax does not make provision for cost of living differentials, and we are not suggesting that such a provision must be made in practice. However, such a correction, conceptually, is one way of understanding the impact that the cost of living differential has on real tax brackets. Such a correction is made to the 1978 income tax structure, and the indexed federal structure is shown in Table 3. Note that the tax brackets are greater after adjustments for higher northern costs. This is because the tax brackets are denominated in nominal dollars and more nominal dollars are needed to achieve the same real income as in southern Canada. However, the marginal tax rate applicable to each tax bracket is unchanged. The substance of the correction is that Northerners must have higher nominal incomes before they are taxed at the same marginal rate as their southern counterparts.

Table 3

THE EFFECT OF ALLOWING FOR THE DIFFERENTIAL COST OF LIVING IN THE NORTHWEST TERRITORIES, FEDERAL INCOME TAX STRUCTURE, 1978*

Taxable Income		Federal Tax Payable		
National Tax Brackets	Equivalent Tax Brackets in "Northern" Dollars	Tax on the Basis of National Tax Brackets	Equivalent Tax in "Northern" Dollars	Plus Marginal Tax Rate up to the Floor or the Next Bracket
$	$	$	$	%
761 or less	1,142 or less	0	0	6
761 - 1,521	1,142 - 2,282	46	69	16
1,521 - 3,042	2,282 - 4,563	167	251	17
3,042 - 4,563	4,563 - 6,845	426	639	18
4,563 - 7,605	6,845 - 11,408	700	1,050	19
7,605 - 10,647	11,408 - 15,971	1,278	1,917	21
10,647 - 13,689	15,971 - 20,534	1,916	2,874	23
13,689 - 16,731	20,534 - 25,097	2,616	3,924	25
16,731 - 21,294	25,097 - 31,941	3,377	5,066	28
21,294 - 36,504	31,941 - 54,756	4,654	6,981	32
36,504 - 59,319	54,756 - 88,979	9,521	14,282	36
59,319 - 91,260	88,979 - 136,890	17,735	26,603	39
91,260 and over	136,890 and over	30,192	45,288	43

* It is assumed that the cost of living in the Northwest Territories is 150 percent of the Canadian average.

Using the tax structure in Table 3, we considered how much one type of resident pays in federal income tax under the existing and a cost-adjusted tax structure. Federal tax is from 31 to 67 percent greater on a taxpayer (married, 2 dependents under 16 years) with the existing tax structure than would be the case under a cost adjusted tax structure (see Table 4). Note that a taxpayer with a

gross income of $12,500 is almost eliminated from the tax rolls when a correction for the cost of living is made. These investigations with a fictitious taxpayer suggests that the effective federal taxation might be much greater in the N.W.T. than would be indicated from the nominal tax structure. Furthermore, they suggest that the federal government may, in fact, be "crowding" the G.N.W.T. in the income tax field. However, the low territorial income tax rate (43%) and the absence of a retail sales tax create uncertainty as to whether the *total* burden is different than it would be in the rest of Canada. This uncertainty can be dissipated by computing the territorial tax rates which would be needed to ensure that the total tax burden is unchanged if the federal income tax liability is computed on the basis of a cost-adjusted income tax schedule. This analysis is undertaken in the following section.

Table 4

THE EFFECT OF ALLOWING FOR THE DIFFERENTIAL COST OF LIVING IN THE NORTHWEST TERRITORIES FOR A TAXPAYER, MARRIED WITH TWO DEPENDANTS, 1978*

Gross Income	Taxable Income		Federal Tax Payable	
	Unadjusted	Indexed for Northern Cost of Living	Unadjusted	Indexed for Northern Cost of Living
$	$	$	$	$
12,500	6,168.60	3,253.60	605.06	16.17
19,000	12,343.60	9,428.60	1,906.22	1,140.88
25,000	18,043.60	15,128.60	3,307.52	2,298.33
40,000	32,293.60	29,378.60	7,338.22	5,601.01

* The Taxpayer is assumed to take the married or equivalent exemption and have two dependent children under 16 years of age. It is assumed that family allowance of $240 p.a. per child is received, RPP is 5 percent of gross income, CPP is $169.20, and UIC is 187.20.

Source: Calculated using the 1978 Individual Income Tax Return. The indexation for northern costs involved indexing personal exemptions standard deduction, employment expense deduction and tax brackets by 150 percent.

Substituting Territorial Taxes for Federal Income Taxes

The Data

The income tax data used in this analysis are based on a sample of individual tax returns published by Revenue Canada as *Taxation Statistics - 1980 Edition* [17]. These data involve an analysis of

returns for the 1978 taxation year, which is also the first full year during which the G.N.W.T. imposed its own income tax. The G.N.W.T. entered the income tax field during 1977 when the existing Established Program Financing arrangements were implemented and substantial tax room was transferred to the provinces by the federal government. Prior to that time, residents of the N.W.T. were subject to a surtax on their federal tax liability and a payment in lieu of income taxes was made to the G.N.W.T. by the federal government. The payment in lieu of income taxes was equal to the revenue raised from the surtax on territorial residents, but the G.N.W.T. did not have the freedom to set its own income tax rate.

There are some problems with the data. First, the sample of individual tax returns underestimates the income tax payable by N.W.T. residents. The actual total tax payable was $45.6 million, while the sample of tax returns indicates it was $40.4 million, and underestimate of 11.4 percent. This raises difficulties when an alternative tax scenario for the N.W.T. is considered. We chose to restrain the alternative tax scenario to raise total revenues of $40.4 million. This increased our confidence in the differential incidence pattern among taxpayers. Restraining the alternative tax scenario to raise $45.6 million enables the (hypothetical) territorial sales tax rate to be raised by approximately 3 percent, a signifigant change in tax effort. This difficulty can be avoided if the actual file of income tax returns, available to the respective governments exclusively, is used to replicate this work.

A second problem arises because the data are grouped by income class. In this study, average income and tax payable are considered representative of all the taxpayers in a given income class. Such a procedure does not predict total income and total tax payable with complete accuracy even for the sample of taxpayers on which *Taxation Statistics* are based. We investigated this problem by using average income to predict total tax payable under the existing tax structure. Our model overestimated total tax payable by 16 percent. Total tax payable may be overestimated when the alternative tax structure is employed as well, so that we will underestimate the effective tax burden on Northerners. This problem whould not arise if the experiment were conducted on the actual sample of individual tax returns, since the difficulty arises because of the grouping of data by income class rather than the sampling procedure employed.

Finally, the alternative tax scenerio includes a retail sales tax. Including a retail slaes tax involved estimating both the tax yield and the incidence of a retail sales tax. The tax yield is a function of the retail sales tax rate and the tax base. The sales tax rate is determined by the data to be the tax rate which will raise sufficient revenue to ensure that the total tax burden on Northerners is unchanged after introduction of an alternative income tax structure. The tax base must be estimated independently.

The tax base for the retail sales tax varies by province [5]. Some of the variations are minor, such as the exemption of some or all purchases by religious institutions in the six eastern provinces. Other variations are major, such as the differential treatment of clothing and mobile homes. All the provinces do agree on the exemption of food. To approximate the tax base for the retail sales tax the total of retail sales less the food group [16] was calculated for each province. Then we estimated the revenue such a tax base would yield to each province and compared the yield to the actual yield from the retail sales tax. In all provinces, the estimated yield was less than the actual yield, implying that the actual tax base for the retail sales tax was greater than first estimated. The actual tax base implied by the tax yield varied between 123 percent (P.E.I.) and 199 percent (Manitoba) of the total retail sales less the food group, and averaged near 150 percent between 1978 and 1980. The estimate of the tax base in the N.W.T. is, then, 150 percent of total retail sales less the food group for 1978. This tax base should give a reasonable indication of the potential for the retail sales tax in the N.W.T.

The incidence of the retail sales tax is assumed to be proportional to income. Such an assumption is consistent with some Canadian studies of the retail sales tax. Furthermore, a rigorous incidence model for a region like the N.W.T. has not yet been developed, and so this assumption avoids implying the estimates are more rigorous than is actually the case. When an incidence model for the N.W.T. is developed, more precise estimates of sales tax incidence can be incorporated. However, the overall results of the income and sales tax substitution are unlikely to be altered substantially, because the sales tax is only a minor part of the tax substitution.

The Experiment and Results

First the income tax structure is indexed for 150 percent cost of living differential. In this case, federal income tax revenues from the N.W.T. are predicted to be $24.7 million. Using the same model, federal income tax revenues are predicted to be $32.8 million if no correction for the cost of living is made. Therefore, indexing the tax structure reduces predicted federal income tax from $32.8 million to $24.7 million, a reduction of 25 percent. Note that the value of comparing predicted tax revenues with and without an indexed tax structure is that average magnitudes are used to represent all the taxpayers in each income class. Consequently, the bias introduced by the estimating procedure should be similar.

We are interested in how much territorial taxes can be raised if federal tax revenues are reduced under an indexed tax structure. In this experiment, territorial taxes are substitued for federal taxes in such a way that total tax revenues remain unchaged. Such a procedure corresponds to the differential incidence framework preferred by public finance specialists [15] and is useful in investingating the change in the distribution of income among income classes.

Initially, the territorial income tax is raised from the present level of 43 percent to the present level of Newfoundland, which is 58 percent. The Newfoundland income tax rate is the highest provincial income tax rate in Canada [4]. However, this change still leaves the total tax burden in the N.W.T. at a level which is lower than initially paid. Consequently, a retail sales tax is introduced at a rate wich ensures the total tax burden is unchanged. In this experiment, there is room to impose a 1 percent retail sales tax which is predicted to raise $1.49 million in gross revenue. Alternative income and sales tax combinations are possible, and it would be useful to extend the analysis in this direction.[7]

The incidence of the tax substitution is also important. The impact incidence is estimated for both existing taxpayers and individuals who do not currently pay income or sales tax. The results are shown in Table 5 and Table 6. The incidence effects are not straightforward, since the reduction in income tax liablilites does not have a direct relationship to the increase in sales tax liabilities. Individuals with incomes under $5,000 do not pay income tax under the altenative tax structure. However, the highest concentration of people who pay no tax under the current income tax structure, and are liable for sales tax under the altenative structure, are also in the same income classes. The tax liability rises for very low income individuals because the increase in sales tax liability is greater than the reduction in income taxes. Total tax liability falls, but by a progressively smaller amount, for most income groups up to the $13,000 income level and increases slightly on most higher income classes. Consequently, the tax substitution is not unequivocally regressive or progressive. It can be said the tax substitution harms those with incomes under $4,000 and is most benificial to those with incomes between $4,000 and $8,000. While tax shifting has not been incorporated into these estimates, it appears these low income groups are least likely to shift the change in tax since they are likely to be most immobile for social, cultural and economic reasons.

[7] This research does not show that the residents of the N.W.T. are more heavily taxed than any other Canadians. Newfoundlanders pay an 11 percent retail sales tax, substantially higher than the hypothetical 1 percent sales tax which is imposed on the N.W.T. Furthermore, there are many combinations of territorial income and sales taxes which could be used to illustrate the potential "crowding" of tax room by the federal government. The choice of a 58 percent territorial income tax is designed to emphasize the "crowding" in the income tax field, since we feel this is of major interest to researchers.

Table 5
THE EFFECT ON A REPRESENTATIVE TAXPAYER OF SUBSTITUTING TERRITORIAL TAXES FOR FEDERAL INCOME TAXES BY INCOME CLASS, NORTHWEST TERRITORIES, 1978*

Income Class	Average 1978 Income Tax (Federal plus Territorial)	Alternative Tax Structure*			Percentage Change In Total Tax Liability
		Federal Income Tax	Territorial Income Tax (58%)	Territorial Sales Tax (1%)	
under 2,000	-	-	-	2.20	-
2,000 - 3,000	4.61	-	-	15.66	239.7
3,000 - 4,000	21.52	-	-	19.26	-10.5
4,000 - 5,000	63.17	-	-	24.86	-60.65
5,000 - 6,000	144.19	37.20	21.58	30.01	-38.4
6,000 - 7,000	258.30	79.78	46.27	35.67	-37.4
7,000 - 8,000	469.14	239.29	138.79	41.46	-10.6
8,000 - 9,000	565.47	283.56	164.46	46.85	-12.5
9,000 - 10,000	895.38	533.13	309.22	52.25	-.1
10,000 - 11,000	972.70	563.46	326.81	57.70	-2.5
11,000 - 12,000	1,291.81	796.65	462.06	63.47	2.4
12,000 - 13,000	1,533.15	924.65	536.30	68.76	-.2
13,000 - 14,000	1,745.76	1,071.74	621.61	74.16	1.3
14,000 - 15,000	2,073.03	1,287.46	746.73	79.55	2.0
15,000 - 16,000	2,373.44	1,474.85	855.41	85.72	1.8
16,000 - 17,000	2,563.69	1,581.13	917.06	90.79	1.0
17,000 - 18,000	2,749.51	1,717.27	996.02	96.53	2.2
18,000 - 19,000	3,157.28	1,945.02	1,128.11	102.00	.6
19,000 - 20,000	3,497.12	2,136.03	1,238.90	107.40	-.4
20,000 - 22,500	3,856.43	2,375.36	1,377.71	117.19	.4
22,500 - 25,000	4,632.18	2,826.60	1,639.43	130.53	-.8
25,000 - 27,500	5,294.87	3,263.54	1,892.85	144.35	.1
27,500 - 30,000	6,059.60	3,701.51	2,146.88	158.21	-.9
30,000 and over	9,125.33	5,681.62	3,295.34	205.01	.6

*The alternative tax structure has indexed personal income tax structure, a 58 percent territorial income tax, and a 1 percent retail sales tax.

Source: Calculated from [17].

Table 6
THE TOTAL EFFECT OF SUBSTITUTING TERRITORIAL TAXES FOR FEDERAL INCOME TAXES, BY INCOME CLASS NORTHWEST TERRITORIES 1978*

Income Class	Total Tax Paid in 1978	Alternative Tax Structure Total Tax Paid By			Change in Tax Liability	
		Previous Taxpayers	Previous Non-Taxpayers	Total	Total	Percentage
$	$	$	$	$	$	%
under 2,000	-	-	19.6	19.6	19.6	-
2,000 - 3,000	1	3.4	11.8	15.2	14.2	1,420.0
3,000 - 4,000	17	15.2	7.7	22.9	5.9	34.7
4,000 - 5,000	59	23.2	4.7	27.9	-31.1	-52.7
5,000 - 6,000	108	66.5	3.5	70.0	-38.0	-35.2
6,000 - 7,000	210	131.5	2.3	133.8	-76.2	-36.3
7,000 - 8,000	380	339.8	.4	340.3	-39.7	-10.5
8,000 - 9,000	393	494.9	.4	495.2	102.2	26.0
9,000 - 10,000	582	581.5	.3	581.8	-.2	0.0
10,000 - 11,000	784	764.1	.2	764.3	-19.7	-2.5
11,000 - 12,000	726	743.1	.2	743.3	17.3	2.4
12,000 - 13,000	1,133	1,130.5	.2	1,130.7	-2.3	-.2
13,000 - 14,000	1,133	1,147.1	.2	1,147.3	14.3	1.3
14,000 - 15,000	1,107	1,128.7	.2	1,128.9	21.9	2.0
15,000 - 16,000	1,144	1,164.5	.3	1,164.8	20.8	1.8
16,000 - 17,000	1,610	1,625.9	.4	1,626.3	16.3	1.0
17,000 - 18,000	1,394	1,424.6	.3	1,424.9	30.9	2.2
18,000 - 19,000	1,626	1,635.2	.4	1,635.5	9.5	.6
19,000 - 20,000	1,822	1,814.3	.4	1,814.7	-7.3	-.4
20,000 - 22,500	4,620	4,636.6	.8	4,637.4	17.4	.4
22,500 - 25,000	4,433	4,398.9	.6	4,399.6	-33.4	-.8
25,000 - 27,500	4,130	4,134.6	.5	4,135.1	5.1	.1
27,500 - 30,000	2,745	2,721.0	.3	2,721.3	-23.7	-.9
30,000 and over	10,266	10,329.7	.8	10,330.5	64.5	.6

*Tax figures are in thousands.
Source: Calculated from [17].

Implications and Conclusions

This analysis suggests that nominal tax rates are not an accurate indicator of total tax burden in the N.W.T. Rather, the lower rate of territorial income tax and the absence of a retail sales tax may be an offset to high effective rate of federal income taxation. Federal tax rates are increased because of the impact of cost of living differentials on nominal incomes in the N.W.T., and the absence of an adjustment to the progressive income tax structure for these cost of living differentials. Our estimates suggest federal taxation may be 25 percent greater than would occur if effective federal tax rates were the same in the N.W.T. as in southern Canada. If effective federal tax rates were not higher, the G.N.W.T. could impose an income tax rate of 58 percent, equal to Newfoundland, and 1 percent retail sales tax, without changing the total tax burden on Northerners. Since Newfoundland imposes an 11 percent retail sales tax, this research does not suggest total tax burdens in the N.W.T. are as high as in Newfoundland. Rather, it suggests that the nominal tax rates do not give an accurate indication of real tax rates in the N.W.T.

Table 7
ALTERNATIVE TAX STRUCTURES FOR THE NORTHWEST TERRITORIES 1978

Structure	Revenue by Level of Government*		
	Federal $	Territorial $	Total $
Current Structure including 43% territorial income tax rate			
Predicted by the taxpayer sample	26.8	13.6	40.4
Predicted by the average incomes in each income class	32.8	14.1	46.9
Alternative Structure including indexed tax structure, 58% territorial income tax and 1% retail sales tax			
Predicted Income Tax	24.7	14.3	39.0
Predicted Retail Sales Tax		1.5	1.5
Total	24.7	15.8	40.5

* Revenue figures are in millions.

Source: [17: Table 5] and Table 6 of this paper.

Many qualifications are in order. The quality of the data for the N.W.T. is disturbing. In particular, the 150 percent cost of living index is illustrative of the problem, but we would be sceptical of any claim that the cost of living differential is known with accuracy. We believe 150 percent is in the range of reasonable estimates, but additional work is needed, including work on the impact or regional variations within the N.W.T. Second, the income tax estimates are based on the sample of individual tax returns published by Revenue Canada Taxation and is not as accurate as the actual returns. Third, the estimate of the retail sales tax base and the incidence assumption of the tax need futher refining. The estimates presented here are preliminary and indicate that the problem is worthy of a serious effort. These estimates are not the basis for policy formation, and the precise magnitude should be interpreted with great caution. This preliminary investigation indicates major areas where data and theoretical deficiencies require sustained research.

This analysis has important implications for the conduct of financial relations between the federal government and the provinces as well as the territorial governments. First, it is unlikely that the federal government will introduce a cost of living adjustment as comprehensive as the indexing procedure outlined here. At a time when the federal government perceives itself as fighting a battle against provincial Balkanization, such a correction could be an admittance of more substantive provincial variations than are politically acceptable. The variations do exist. Residents of some provinces, notably Newfoundland and British Columbia, are probably overtaxed by the federal government for the same reason outlined here. Furthermore, residents of other provinces must be undertaxed if federal government revenue is to remain unchanged. It seems more likely that these estimates, for provinces as well as territories, could be used to adjust the appropriate transfers from the federal government to the other governments. At any rate, the problem must be recognized and analysed before solutions are considered.

The federal government has said that the residents of the N.W.T. are undertaxed because G.N.W.T. tax rates are below the Canadian average. This position is based on a comparison of nominal tax rates, which this paper shows can be a seriously misleading comparison. There is a related issue arising from the favourable tax treatment of imputed benefits from some northern employees [12]. These allowances are for subsidized housing and travel. The failure to include these benefits in income for tax purposes results in lower effective tax rates on the recipients of such benefits. In part, this may be viewed as an offset to the impact of the cost of living on the income tax structure, although the federal government has not made such an argument.

No data are available on the amount or distribution of imputed benefits. The current treatment creates a serious inequity between the recipients of such tax-free benefits and other northern residents. There is now a discussion of this issue, but as yet the role of the cost of living on the income tax structure has not been a part of that discussion. A federal government proposal to tax all imputed benefits received by Northeners was advanced in 1980 and postponed for three years. During the three year moratorium, the federal government decided to refund taxes paid on similar imputed benefits by other Northerners, and a substantial number of individuals received refunds. Since there were only 28,000 returns in the N.W.T. and the Yukon in 1978, it appears that a number of residents are not receiving differentially favourable treatment of benefits. However, the entire issue of imputed benefits lies beyone the scope of this paper.

There has been little research on the public finance problems of the N.W.T. This is unfortunate, since the pressure for resource development in the frontier regions is severe and the impact on the economic and social structure of the region is unclear. This preliminary examination has recognized major areas for research. In most of these areas, the absence of good data makes progress problematic. This is one jurisdiction where the benefits from collecting good primary data are likely to be great. A tax burden study which included additional taxes would also be desirable, but significant advances are unlikey to be made without the theoretical foundation for an incidence model for the N.W.T. More research is needed on the problems of such a unique region.

References

1. Allan, J. R., D. A. Doge, and S. N. Poddar. "Indexing the Personal Income Tax: A Federal Perspective," *Canadian Tax Journal*, 22 (1974), 355-69.
2. Boadway, R. M. *Intergovernmental Transfers in Canada*. Toronto: Canadian Tax Foundation, 1980.
3. Buchanan, J. M. and C. J. Goetz. "Efficiency Limits of Fiscal Mobility: An Assessment of the Tiebout Model," *Journal of Public Economics*, 1 (1972), 25-45.
4. Canadian Tax Foundation. *Provincial Finances, 1980*. Toronto: 1980.
5. Canadian Tax Foundation. *Provincial and Municipal Finances, 1978*. Toronto: 1978.
6. Courchene, T. J. and G. H. Copplestone. "Alternative Equlization Programs: Two Tier Systems," in R. M. Bird (ed.) *Fiscal Dimensions of Canadian Federalism*. Toronto: Canadian Tax Foundation, 1980, 8-45.

7. Department of Indian Affairs and Northern Development. *Federal/Territorial Financial Relations*. Ottawa: 1980.
8. Department of Indian Affairs and Northern Development. *Northwest Territories 1976-77 Potential Revenues*. Ottawa: 1976.
9. Drury, C. M. *Constitutional Development in the Northwest Territories: Report of the Special Representative*. Ottawa: Department of Supply and Services, 1980.
10. Flatters, F., V. Henderson, and P. Mieszkowski, "Public Goods, Efficiency and Regional Fiscal Equlization," *Journal of Public Economics*, 3 (1974), 99-112.
11. Government of the Northwest Territories. *Main Estimates, 1980-81*. Yellowknife: Bureau of Statistics, 1980.
12. Government of the Northwest Territories. *Position Paper on the Issue of the Taxation of Northern and Isolated Post Benefits and Allowances*. Yellowknife: 1980.
13. Government of the Northwest Territories. *Spatial Price Survey: Yellowknife-Edmonton, June 1980*. Yellowknife: Bureau of Statistics, 1980. 14. Graham, J. F. "Comment," in R. M. Bird (ed.), *Fiscal Dimensions of Canadian Federalism*. Toronto: Canadian Tax Foundation, 1980, 45-54.
15. Musgrave, R. A. *The Theory of Public Finance*. New York: McGraw-Hill, 1959.
16. Statistics Canada. *Retail Trade*. Cat. 63-005, monthly. Ottawa: 1978-80.
17. Revenue Canada. *Taxation Statistics, 1980 Edition*. Ottawa: Supply and Services Canada, 1980.
18. Vukelich, G. "The Effect of Inflation on Real Tax Rates," *Canadian Tax Journal*, 20, 4 (1972), 327-42.