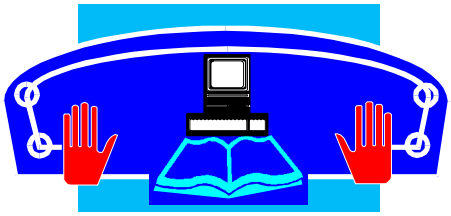

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FUR TRAPPERS IN THE NORTHWEST TERRITORIES:

An Econometric Analysis of the Factors Influencing Participation

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Abstract

Commercial fur trapping, once the primary economic activity of the aboriginal inhabitants of the NWT, now accounts for only a small fraction of the income received by native people. Many adult native males do continue to engage in commercial trapping, nevertheless, though with varying degrees of commitment. A review of the recent literature reveals a wide variety of suggested motivations for this continuing involvement. Through the use of econometric techniques we are able to identify two distinct sub-groups of trappers. One group, accounting for about 15 percent of those who trap, have a substantial commitment to the activity and are motivated primarily by the income earning potential of fur sales. The second group, which includes approximately 85 percent of the participants, consists of those whose participation is best explained by the lack of alternative employment opportunities.

FUR TRAPPERS IN THE NORTHWEST TERRITORIES:

An Econometric Analysis of the Factors Influencing Participation

Introduction

The role of the traditional sector in native economies has long been a focus of attention for social scientists with-research interests in the north. Prior to the mid-twentieth century, semi-nomadic natives were dependent on the traditional sector for both subsistence and, through the sale of furs, most of their cash. Following World War Two, fur prices began an erratic secular decline in real terms while the cost of purchased inputs rose. The result was a "cost-price squeeze," a situation familiar to producers of numerous other primary products.

The native people's semi-nomadic lifestyle was replaced during the 1950s by permanent habitation in numerous small Villages scattered throughout the north. Provision of modern housing, health care facilities and an expansion of social assistance programs, coupled with compulsory schooling and the gradual availability of jobs in the modern economy, reinforced the permanency of village life.

Native people have continued to engage in traditional pursuits through the 1980s and, while income received from the sale of furs now provides only a small share of total cash income, there is ample evidence that a substantial portion of native sustenance is currently obtained from traditional sources.

The focus of northern social science research has reflected the evolving structure of the economy, the types of activities engaged in by native people at each stage of development, and the problems faced particularly during periods of stressful transition. Thus, addressing the period during which the traditional sector formed the backbone of the northern economy, writers analyzed its structure and explained how it functioned

(Innis, 1930; Crean, 1962; Francis and Morantz, 1983); interpreted the methods used to allocate common resources (Ray, 1978; Morantz, 1980; Harper-Fender, 1981; Flannery and Chambers, 1986); or attempted to determine the nature and significance of activities engaged in by native people (Rich, 1960; McMannus, 1972; Eccles, 1973; Ray, 1974; Trigger, 1985). The crisis which followed the collapse of fur prices after World War Two is discussed in Shimkin, 1955; Dunning, 1958; and Vallee, 1962, while the period of transition from hunter to worker – still in process – is analyzed by Gladstone, 1953; Kew, 1960; VanStone, 1963; Asch, 1977; George and Preston, 1987; and Stabler, 1988.

Recently, a substantial amount of effort has gone into identifying and quantifying the extent to which the wild harvest satisfies subsistence needs. This work demonstrates that a significant portion of native food requirements are met from traditional sources (Rushforth, 1977; Myers, 1981; Mackey and Orr, 1986; Usher and Wenzel, 1987; Wolfe and Walker, 1987). On the other hand, commercial trapping, as such, has not received much focussed attention from social scientists in recent years although, in passing, some researchers have identified that portion of an area's total cash income obtained from the sale of furs (Hobart, 1981; Meyers, 1981; Quigley and McBride, 1987). In addition, the few interpretations offered of native people's motivations for continuing to participate in traditional activities generally, or trapping more specifically, range across an infinitely wide spectrum. Rushforth (1977, p. 32), for example, argues that wage labour is seen not as a "permanent alternative to traditional land use activities but solely as a means of obtaining the tools they require in the bush," a view shared by Berger (1977, p. 101). On the other hand, Kew (1961, p.) identifies trapping as the "employer of last resort," an interpretation supported by DIAND and MPS Associates (1973, vol. 5) and Gemini North (1974, vol. 5). In our view both interpretations are extreme and therefore incorrect because they neither allow for the influence of changing relationships between effort and reward nor do they provide sufficient realistic options for the interpretation of either individual or sub-group behavior.

In this paper we explicitly investigate selected aspects of the commercial trapping industry in the Northwest Territories (NW T). We identify the number of people who trapped commercially between 1973/74 and 1986/87, the total amount of income

earned, and the distribution of this income. We note that the number of individuals trapping commercially reached a high of 4,336 during the 1980/81 season and a low of 2,903 in 1986/87; there was considerable variation between these extremes as shown in Figure 1. We attempt to identify, through econometric analysis, those factors which influence participation in this activity. Through the use of this objective technique, we hope to provide greater insights into the motivation of native people for participating in the trapping industry than what can be obtained through only a review of the existing literature.

Background

Statistics describing activity patterns by ethnicity in the NWT have not been available historically in sufficient detail to permit a general analysis of native participation in both modern and traditional activities. (Shortcomings of Census, DIAND and other historical data are identified in Stabler, 1988). Recently, however, new and more comprehensive data have become available; further, time series of certain data sets initiated earlier now contain sufficient observations to permit more sensitive analysis than what was previously possible.

A survey conducted in 1984 of 11,164 NWT residents between ages 15 and 64 produced detailed, comprehensive information on activity patterns by ethnicity, including a substantial description of participation in traditional pursuits (NWT Bureau of Statistics, 1984). These data revealed an intricate pattern of participation by native people in both modern and traditional activities. Selected aspects of that pattern, pertinent to the subject of this paper, are identified in Table 1. As shown in the table, 66 percent of native males without jobs were engaged in traditional activities while 50 percent of those with jobs also participated. Further analysis of the characteristics of those involved in traditional pursuits revealed that participation, in genera], was directly related to age, lack of education, and unemployment. Employment in the modern sector was directly related to level of education: 75 percent of the native people with high school diplomas were employed in 1984, while only 44 percent of those with less

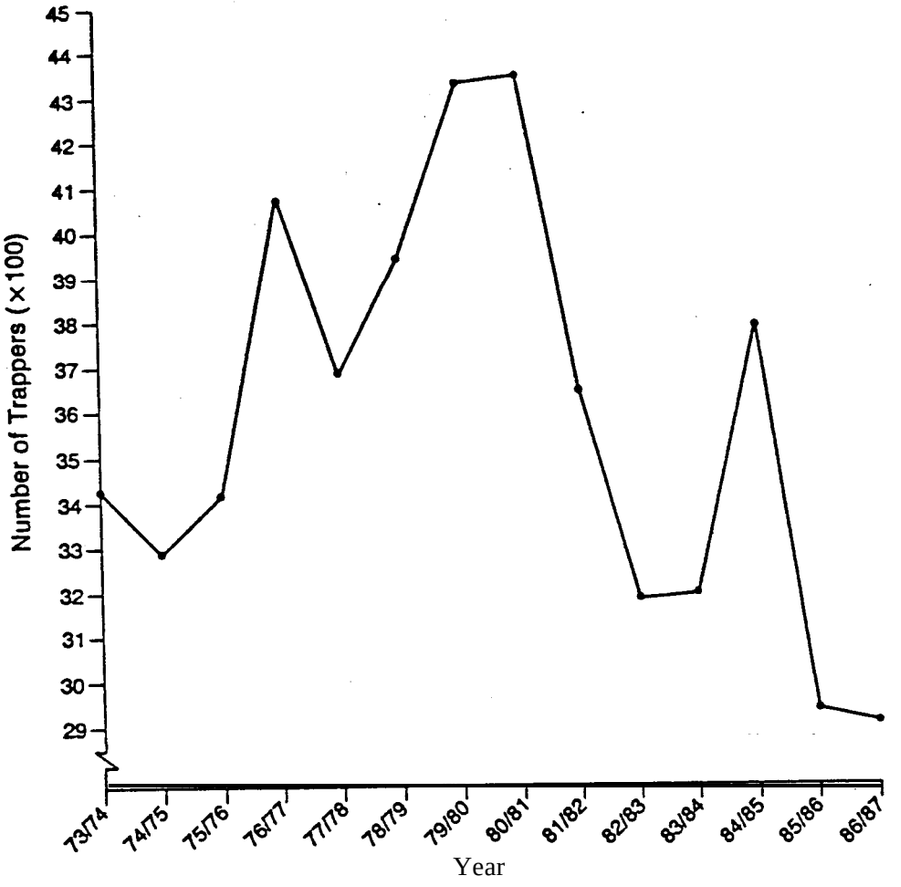

FIG. 1. Number of commercial trappers in the NWT, 1973/74 to 1986/87.

than high school education held jobs. Further, participation in traditional activities by native men with jobs was directly related to age: 45, 50 and 59 percent respectively for the 15-24, 25-44 and 45-64 age groups.

TABLE 1: NWT NATIVE MALES,[1] AGED 15--64, BY EMPLOYMENT STATUS AND PARTICIPATION IN TRADITIONAL ACTIVITIES,[2] AT THE TIME OF THE 1984 SURVEY

Employed			Not Employed		
3,241			4,018		
Engaged in Traditional Activities			Engaged in Traditional Activities		
None	Part-Time	Year Around	None	Part-Time	Year Around
1,611	1,242	388	1,366	1,987	665

Source: Derived from NWT Bureau of Statistics, *Labour Force Survey, 1984.*

[1] Female participation in traditional activities is much lower than males and is concentrated (76 percent) in part-time activity of 1-3 months' duration.

[2] Traditional Activities include hunting, fishing and trapping for both commercial and subsistence purposes.

Additional distinctions were possible between those engaged year-around versus those involved part time. Full-time participation of males aged 45-64 was nearly twice as great as that of 15–24 year-olds, and was 33 percent greater than that of males between 25 and 44. Further, those participating full time in traditional activities had, as a weighted average, only about 58 percent the years of formal education as those who did not participate at all. These observations suggest that year-around involvement in the traditional sector may be seen as the major alternative to employment predominantly

by those people who have no realistic expectation of permanent or even regular seasonal employment in the modern economy.

The characteristics of part-time participants, on the other hand, resemble more closely those of non-participants. Proportions of each age-group engaged part time are nearly equal (47, 42 and 46 percent respectively beginning with the youngest); further, part-time participants have, as a weighted average, 87 percent as much formal education as non-participants. However, 89 percent of those without jobs engaged part time in traditional pursuits indicated that they wanted a job in the modern economy. It would seem plausible to infer, therefore, that part-time participants consist of two sub-groups, neither of which regard trapping as their primary occupation: (1) those without work, who want a job, and who have a reasonable expectation of either permanent or regular seasonal work in the modern economy; and (2) those with jobs who are either attempting to supplement their incomes, or are participating for recreational reasons or to preserve their cultural identity.

If the interpretation just posited is correct, it should be possible, with data specific to the trapping industry, to identify two groups of trappers, each of which responds to a somewhat different set of influences. In particular, part-time trappers should be more sensitive to employment opportunities in the modern sector than those engaged full time.

Data and Methodology

Native people in the NWT do not require a license to hunt for subsistence purposes. They do, however, require a General Hunting Licence, which is obtained by right, in order to trap commercially. In addition, fur dealers in the NWT are compelled to keep records of furs purchased from trappers. These records, which are maintained by the NWT Department of Renewable Resources, form a major part of the data base used for this study. Summary information regarding number of trappers and returns from fur sales is reported in Table 2.

TABLE 2: TRAPPERS,[1] GROSS RECEIPTS FROM FUR SALES, AND DISTRIBUTION OF G ROSS PRODUCT, N WT, 1973/74 TO 1986/87[2]

Year	Number of Trappers	Total Gross Receipts[3]			Distribution of Real Gross Product	
		Nominal Revenue	Real Revenue[4] (1981 Base)	Real Product[5] (1981 Base)	Under $2,000	Over $2,000
1973-74	3,426	$3,067,884	$6,167,841	$3,364,163	2,997	429
1974-75	3,282	2,175,115	3,958,353	3,285,922	2,822	460
1975-76	3,413	2,742,481	4,512,144	2,888,950	3,000	413
1976-77	4,089	4,317,141	6,620,366	4,385,786	3,589	500
1977-78	3,679	3,837,896	5,479,578	3,928,592	3,243	436
1978-79	3,925	5,739,422	7,618,028	4,310,014	3,360	565
1979-80	4,319	5,337,411	6,530,541	4,221,192	3,675	644
1980-81	4,336	5,029,151	5,594,162	4,547,769	3,666	670
1981-82	3,635	3,737,928	3,737,928	3,737,928	3,086	549
1982-83	3,167	2,794,711	2,535,575	2,570,832	2,795	372
1983-84	3,191	2,665,886	2,275,424	2,451,153	2,857	334
1984-85	3,790	3,295,438	2,693,452	2,851,823	3,386	404
1985–86	2,922	3,267,885	2,567,679	2,379,051	2,532	390
1986-87	2,903	5,656,162	4,263,011	2,835,263	2.452	451

Source: Department of Renewable Resources.

1 A very few long-term non-native residents of the NWT also hold General Hunting Licenses. These people are not separately identified in the analysis since their numbers are insignificant.

2 The figures are "gross" in that the costs incurred in harvesting the furs have not been deducted. The information required for such a calculation does not exist at this time.

3 Income received for furs, hides and pelts sold privately or retained for personal use is not included in these figures. NW T Renewable Resource officials estimate these dispositions to be limited.

4 Real revenue is computed by dividing the nominal revenue figures by the personal expenditure implicit price deflator using 1981 as the base.

5 The real product is computed by valuing each year's production of hides and pelts sold, by type, in terms of their 1981 prices. Twenty types are included: polar bear, other bear, beaver, coyote, fisher, blue fox, cross fox, red fox, silver and black fox, white fox, lynx, marten, mink, muskrat, otter, seal, squirrel, weasel, wolf and wolverine.

The nominal dollar figures shown in column 3 of Table 2, however, are not particularly informative. First, income earned from the sale of furs is used to purchase both consumer and capital goods sold at retail, but consumer prices rose substantially between 1973 and 1987. A better indication of the purchasing power of the revenue gained from fur sales is obtained by dividing the nominal dollar figures in column 3 by the personal expenditure implicit price deflator. This calculation produces the "real gross revenue" figures shown in column 4.

A second correction of the nominal revenue figures in column 3 is required in order to put the production figures on a consistent basis. Both the species composition of the fur harvest and the price paid for each type of fur varied from year to year between 1973 and 1987. A consistent measure of the production (or output) of furs is obtained by valuing each year's harvest of hides and pelts sold, by type, in terms of their 1981 prices. This calculation produces the "real product" figures in column 5 which were subsequently used in constructing columns 6 and 7.

In addition to receipts from the sale of furs, trappers are the beneficiaries of loan and assistance programs managed by the NWT Department of Renewable Resources. One of these programs, for example, advances a portion of the appraised value of the catch prior to sale. This program undoubtedly is of assistance to the trapper but is, in effect, a loan which has to be repaid. It is doubtful, therefore, that this program systematically influences the decision of whether to trap or not. A trapper's incentive program, on the other hand, provides a subsidy based on the value of total sales to trappers selling at least $600 worth of fur. This program does increase the trapper's income and could be expected to have the same influence as higher fur prices (with no subsidy). In parts of the subsequent analysis, trappers' incentive payments (divided by the personal expenditure implicit price deflator) have been added to receipts from fur sales to construct a variable which captures the total gross income received as a result of trapping. The yearly amounts of trapper's incentive grants from the inception of this program are shown in Table 3.

For our analysis, trappers were separated into two groups: those producing

TABLE 3: TRAPPERS' INCENTIVE GRANTS, NWT, 1977-87

Year	Incentive Grants[1]	
	Nominal	Real (1981 base)
1977-78	$285,148	$407,122
1978-79	328,000	435,360
1979-80	163,755	200,362
1980-81	502,204	558,625
1981-82	421,779	421,779
1982-83	341,261	309,618
1983-84	386,254	329,681
1984-85	342,984	280,330
1985-86	400,097	314,369
1986-87	963,000	725,806

Source: NW T Territorial Accounts

1 Incentives are currently paid on the basis of 25 percent on the first $2,000 of fur sold, decreasing by 5 percent on each additional $2,000 increment up to $8,000. An incentive of 5 percent is paid on any sales over $8,000.

less than $2,OOO of real product and those producing $2,000 or more. In keeping with conventional economic theory, it was hypothesized that participation of both groups would be positively related to monetary return (fur sales plus incentive grants). Based on observations from the NW T Labour Force Survey data it was further hypothesized that the participation of those with $2,ooO or more of real product (representing a greater commitment to traditional activities) would not be influenced by the availability of jobs in the modern economy, but that those with under $2,000 would be positively influenced. Finally, participation of both groups was hypothesized to vary positively with both temperature and native population, the former capturing the disutility of being out in colder weather, and the latter capturing the influence of both an increased number of dependents as well as an increased number of potential participants.

Results

The results of the econometric analysis are reported in Table 4 for trappers producing a real gross product of less than $2,000 and in Table 5 for those with $2,000 or more.

In Table 4, the dependent variable is the number of trappers with real gross product of less than $2,000. In addition to the constant term, the independent variables are:

- total employment in the NWT in thousands;
- the average mean daily temperature in degrees celsius for the months October through February at Yellowknife;
- native population in thousands;
- a dummy to account for the change in methodology used by Statistics Canada to collect employment data, equal to 1 before 1983 and 0 from 1983 on;
- a dummy which is equal to 1 in 1984 and 0 elsewhere to correct for a large unexplained difference between actual and predicted values in that year.

TABLE 4: EQUATION FOR TRAPPERS WITH REAL GROSS PRODUCTION OF LESS THAN $2,000[1]

Independent Variables	Regression Coefficients	T Values	Elasticities	Means
Intercept	7,539.59	5.88	—	—
Total Employment	-372.04	-3.07	-1.07	8.89
Weather	61.43	2.26	-0.36	-17.96
Native Population	91.20	2.40	0.73	24.90
Employment Dummy	-3,351.51	-2.47	-0.76	0.71
D 84	1.036.69	4.20	0.02	0.07

1 R^2 = 0.8812; $\bar{R}^2$ = 0.8069; Durbin-Watson Statistic = 2.639; Average Absolute Percentage Error = 3.70 percent.

All coefficients are significant at the 5 percent level except weather which is significant at the 10 percent level.

The Durbin- Watson Statistic shows no evidence of autocorrelation.

The equation suggests that, all else being equal, an increase in total employment of 1,000 people in the N WT will lead to a reduction of 372 trappers whose gross production is less than $2,000. An increase in the average temperature of one degree celsius will lead to an increase of 61 trappers, while an increase of 1,000 in the native population will lead to an additional 91. These relationships are stated in percentage terms in the elasticities column.

Of considerable interest is what is not included in this equation. Neither the income variable (receipts from fur sales) nor the trapper's incentive grant, separately or combined, in nominal or in real terms, was significant in any specification tried.

Taken altogether, this analysis implies that participants with under $2,000 gross production are, as a group, involved in the trapping industry because of a lack of alternative employment opportunities, rather than because of its income-producing potential.

In Table 5, the results for trappers with gross production in excess of $2,000 are reported.

The independent variables for this equation, in addition to the intercept, include the following:

. Trapping revenue per capita in real terms, lagged one period. This variable is calculated as the annual nominal dollar receipts from fur sales p] us the nominal dollar sum of trappers' incentive grants. This sum is divided by the personal expenditure implicit price deflator, and the result is divided by the native pop ulation of the NWT. This variable is lagged one period to reflect the practice of basing the decision regarding the current year's activity on the latest (last year's) information.

. A terms-of-trade variable, which was constructed by dividing the nominal dollar total receipts from fur sales by the real output of fur. The result of this calculation produces the implicit price deflator for fur. The fur price deflator was then divided by the personal expenditure implicit price deflator to indicate whether the fur price index was rising or falling relative to the price of consumer goods.

TABLE 5: EQUATION FOR TRAPPERS WITH REAL GROSS PRODUCTION OF $2,000 OR MORE[1]

Independent Variables	Regression Coefficients	T Values	Elasticities	Means
Intercept	-340.37	**-1.97**	—	—
Revenue Per Capita $(T-1)$	1.08	**6.56**	0.47	205.79
Terms of Trade	**148.80**	**3.41**	0.42	1.32
Native Population	15.72	**3.46**	0.83	24.90
D 77	-113.97	**-2.78**	-0.02	0.07
D 80	141.66	**3.48**	0.02	0.07

[1] R^2 = 0.9178; $\overline{R}^2$ = 0.8664; Durbin-Watson Statistic = 2.487; Average Absolute Percentage Error = 4.94 percent.

All coefficients are significant at the 5 percent level.

The Durbin-Watson Statistic shows no evidence of autocorrelation.

. Native population in thousands.

. Dummy variables set at 1 for 1977 and O elsewhere and at 1 for 1980 and O elsewhere to correct for unexplained differences between actual and predicted values in those years.

This equation indicates that, *ceteris paribus*, an increase in real revenue of $1.08 per capita leads to an increase of one trapper in the $2,000 plus category. During the period under study, real per capita income from fur sales (including incentive payments) averaged approximate y $206 per year. An increase in real revenue of $1.08 per capita amounted, on average, to a total increase of nearly $27,000 ($1.08x24, 900). In addition, an increase of 1.00 in the terms of trade index would lead to an increase of 149 more trappers, while an increase of 1,000 in the native population would lead to an additional 16. The elasticities state these relationships in percentage terms.

Once again, what is left out is as interesting as what is included. Neither employment in the modern sector nor temperature had a significant influence on the participation of trappers with real gross production of $2,000 or more.

Conclusions

The observations based on direct information about trappers and the trapping industry support many of the inferences made from the labour force survey data. Specifically, participation of trappers with real gross output of less than $2,000 is observed to be inversely related to the availability of jobs in the modern economy and to the severity of the winter, rather than to income obtained from trapping. The coefficient on the employment variable indicates that an increase of 1,000 in total employment in the NWT would lead to a reduction of 372 trappers in the under-$2,000 category. This number is very close to the proportion that native employment is of total employment in the NWT – 34.5 percent – as reported in the 1984 labour force survey.

Participation of trappers with real gross production in excess of $2,000 was positively related to the real income variables: e.g., fur revenue per capita and terms

of trade. However, their participation was not systematically influenced by either the availability of jobs in the modern sector or the severity of the winter. These observations lend further support to inferences made from the labour force survey data. Those individuals with the greatest commitment to the trapping industry consist predominantly of people with limited or sporadic involvement in the modern sector, trapping being, in this case, a substitute for employment in the modern economy. Their participation is directly related to the income-generating potential of the trapping activity since it is likely that this is, for them, a major source of cash income.

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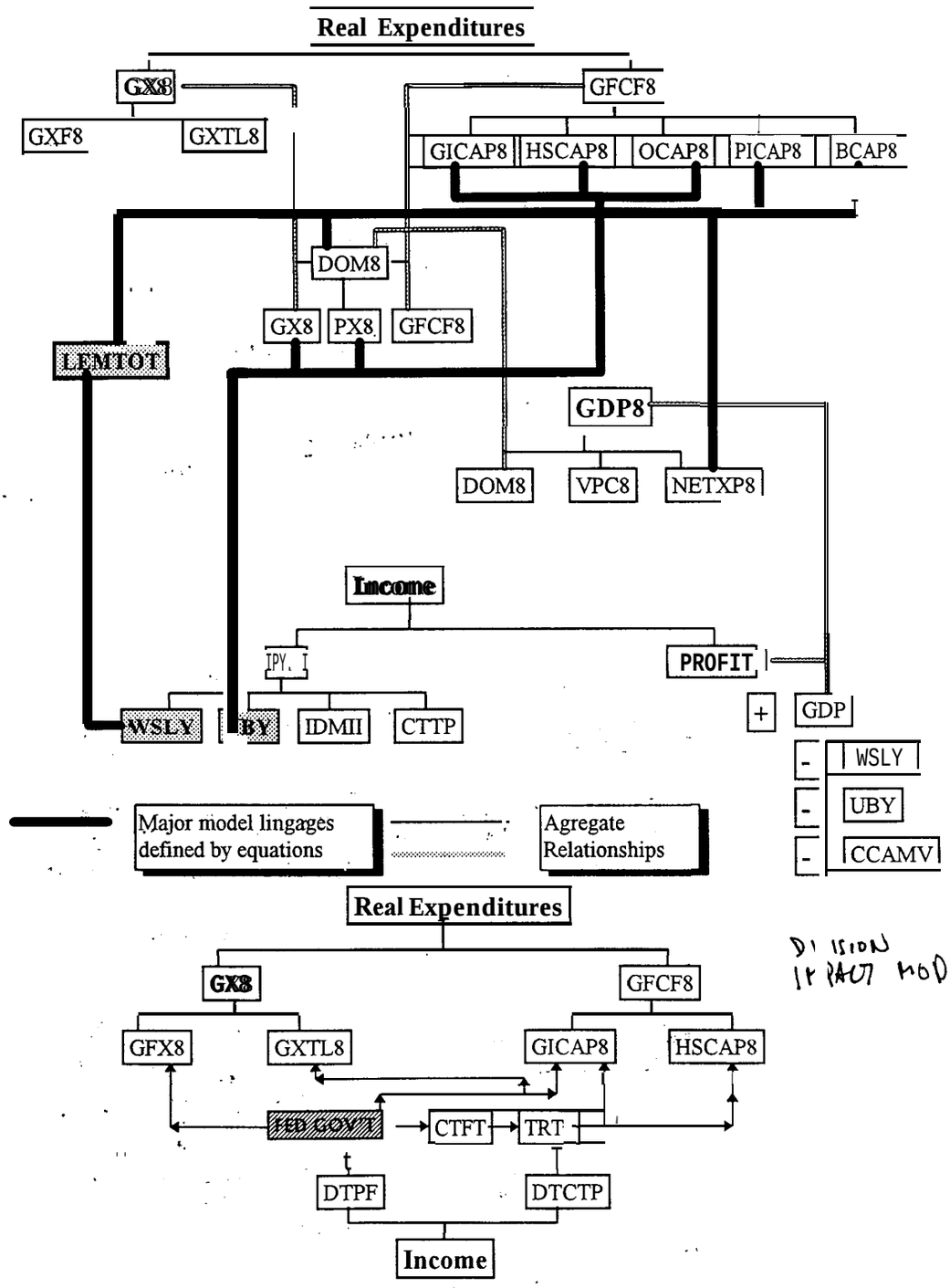

DIVISION IMPACT MODEL