Households' Expenditure Patterns and Income Distribution in the Canadian Agriculture and Food Industries: An Input-Output Analysis

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RÉSUMÉ

La présente recherche a pour objet de démontrer le besoin, la faisabilité ainsi que l'utilité d'une désagrégation par groupe de revenu du secteur des ménages dans le modèle par entrées-sorties Canadien. Les dépenses personnelles et les sources de revenu ont été intégrées dans le modèle par entrées-sorties ouvert d'Agriculture Canada Deux modèles furent développés. Le premier (Modèle 1) est un modèle fermé qui suppose une homogénéité des ménages. Le deuxième (Modèle 2) atténue cette supposition.

La supériorité du Modèle 2 fut empiriquement démontrée en comparant les indicateurs générés par les deux modèles. Les indicateurs étudiés sont: le produit industriel, le PNB au coût des facteurs et le nombre d'emplois rémunérés. Plusieurs simulations ont été complétées afin d'explorer l'impact des changements de salaires et de la demande finale sur les modèles. Les plus grandes différences entre les deux modèles furent observés lorsque les salaires varient. Tel que supposé, le Modèle 1, d'une part, sous-estime, par 19.9 pour-cent la contribution des ménages à faible revenu, et, d'autre part, sur estime l'impact des ménages à revenu élevé et ce, par 19 pour-cent. Une augmentation de 1$ million de la demande finale dans les secteurs agricoles, agro-alimentaires et pétrochimiques ont de plus été simulés. L'impact de cette augmentation est plus importante en agriculture (3.8$ millions). Le secteur agro-alimentaire (3.2$ millions) précède le secteur pétrochimique (2.7$ millions). Alors que les différences dans les estimations du modèle étaient

minimales lorsque des changements dans la demande finale étaient simulés, le Modèle 2 a généré de l'information additionnelle sur la distribution des revenus.

En conclusion, les résultats générés par le modèle par entrées-sorties dont le secteur des ménages est désagrégé (Modèle 2) sont en accord avec la théorie économique et les données budgétaires.

ABSTRACT

The objective of the research was to demonstrate the need, feasibility and relevance of disaggregating by income group the endogenized household sector in the Canadian Input-Output (I-O) model. Personal expenditures and revenue sources were endogenized into Agriculture Canada's I-O open model. Two models were developed, Model 1 and Model 2. Model 1 was a closed model that assumed homogeneity among households. Model 2 relaxed the homogeneity assumption.

The superiority of Model 2 was empirically demonstrated by comparing the economic indicators generated by the models. The indicators of interest were industrial output, GDP at factor cost and the number of paid jobs. A sensivity analysis investigated the impact of changes in wages and salaries and final demand on the models. Larger differences were found between the models when wages and salaries were stimulated. As hypothesized, Model 1 underestimated the contribution of the lowest wages and salaries group by 19.9 percent and overestimated the impact of the higher wages and salaries group by 19 percent. A $1 million increase in the final demand for agricultural, agri-food and petrochemical products was also simulated. The largest impacts on industrial output occurred when agricultural production was shocked ($3.8 million). This was followed by agri-food products ($3.2 million) and petrochemical products ($2.7 million). While differences in the models' estimates were minimal when changes in final demand were simulated, Model

2 generated additional information on the distribution of income.

In conclusion, the results generated by the I-O model with the disaggregated household sector, Model 2, were consistent with budget data and economic theory.

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Chapter 1

INTRODUCTION

1.1 Introduction to the Problem

An Input-Output (I-O) model describes the structural relationships that exist between industries in modern economies. In a rectangular I-O framework it is possible to identify the goods and services that are purchased by industries in production process. The goods and services produced in the various industries are depicted. The accounting tables identify exchanges that occur among industries, therefore, showing interdependence among the sectors involved in the production process.

The estimates from this model measure the direct and indirect requirements needed to satisfy a change in exogenous demand. In such a format, the reactions of households are ignored. When production increases as a result of an autonomous change in final demand, households receive more income as a consequence of increased industrial activity. It is expected that households will respend the increased income on other goods and services produced in the economy. The result of this *extra* spending is represented by the induced effect. Because the induced effect measures the reaction of households to the initial change in autonomous final demand, an open model is viewed as incomplete.

To measure the induced effects of households in an I-O model, the model is extended to endogenize personal expenditures and primary inputs and households' revenue sources as outputs. Endogenizing the households

components into the I-O model is called closing the model to households. A model closed to households is a model *extended* with the multiplier mechanisms provided by the Keynesian consumption function (Miyazawa, 1976). A closed model will estimate the direct, indirect and induced effects on the economy.

The procedure used most often to close a model to households consists of specifying a single row and column of household income and expenditure. With this approach, households are assumed homogeneous. This assumption ignores the fact that households' economic behaviour is a function of income. The average propensity to consume is assumed to be equal to the marginal propensity to consume. A household sector defined using homogeneity is in conflict with the postulates of economic theory. Estimates of the induced effects are truncated. By ignoring the distribution and the initial level of income and expenditure patterns, the model will either overestimate or underestimate the results of the analysis.

One solution to the problem raised by this assumption is to disaggregate the household sector by income groups, thus introducing greater flexibility in the accounting framework. A closed I-O model with disaggregated households can address questions contingent on the distribution of income. For example, it can be useful in development, market research, studies on poverty and in public policy formulation.

1.2 Objective and Scope of the Research

Households are exogenous in the open I-O model developed by the I-O Section of the Canadian National Accounts Division of Statistics Canada. The open model approximates both the direct and the indirect effects of an autonomous change in final demand on the economy. The objective of this present research is to demonstrate the need, feasibility, and relevance of building a disaggregated closed I-O model for Canada, by means of empirical evidence. The disaggregation of the household sector is important for assessing the economic impacts of high income and employment-generating projects. As indicated by Stone (1985:181): "that of all interesting and useful things that could be done to improve the national accounts the one most worthy of consideration is the disaggregation of the household sector."

The research will be implementing, at the National level for Canada, the rectangular I-O model developed by the National Accounts Division and further disaggregated by Agriculture Canada (Thomassin *et al.*, 1992a). The analysis will contrast a closed model with a composite vector of personal expenditure (Model 1) with a disaggregated model (Model 2). Sensitivity checks will be performed for changes in both exogenous income and final demand. The results will indicate the magnitude of the difference between the direct, indirect and induced effects in the two models. Model 2 is expected to act in accordance with economic theory and empirical facts. If the objectives of this research are met, the model with the disaggregated sector could be used in

different research areas by agricultural economists and public policy analysts.

1.3 Organization of the Research

The research is divided into six chapters, including this one. Chapter 2, *Literature Review*, outlines the developments of I-O analysis and lists basic references. Key sources are given to research techniques used to close and disaggregate I-O models. In Chapter 3, research methods, questions to be answered and hypotheses are outlined. The procedures used to close the rectangular I-O model with respect to households are described. Implications of the technical assumptions used in the I-O model and in the closing of the model to households are discussed. In Chapter 4, a disaggregated household sector is developed. Emphasis is placed on the methods, concepts and definitions of the data sources used throughout the disaggregation procedure. Empirical evidence is presented in Chapter 5. A conclusion follows in Chapter 6, where the implications of the results are discussed and future research directions are suggested.

Chapter 2

LITERATURE REVIEW

2.1 Introduction and Overview

Since World War II, there has been a rapid growth in the development of I-O analysis (Rose and Miernyk, 1989). Introduced by Leontief (1941) in the late 1930s, the I-O framework is now a basic component of the national accounts in many parts of the world. The idea of Leontief (1986) was to study the interdependence in industrial economies by observing empirical facts. In Canada, the Input-Output Division of Statistics Canada has a long history of I-O use and development (Statistics Canada, 1987b). Agriculture Canada possesses its own model disaggregated for agriculture and especially designed to address policy related questions (Hassan and Narayanan, 1987; Thomassin and Andison, 1987; Thomassin *et al.*, 1992a). A rectangular interprovincial I-O model has been developed by Statistics Canada (1984). A price model looking at the effects of exogenous changes in prices was also developed by Statistics Canada. An application of the latter can be found in Gigantes and Hoffman (1972).

I-O analysis has been used by agricultural economists to study the linkages existing between agriculture and the rest of the economy (Midmore, 1991). Applications of I-O in the Canadian context using a rectangular framework are numerous. For example, a model was developed for the province of Saskatchewan to study the linkages between different subsectors of agriculture (Johnson and Kulshreshtha, 1981). Gould (1986) developed

rectangular I-O resource-use models to study resource utilization arising from structural change in Saskatchewan. The macroeconomic impacts of building an ethanol industry in Canada based on Jerusalem artichoke are explored by Thomassin *et al.* (1992b).

I-O has also been used in conjunction with other quantitative techniques used in economics, namely linear programming and econometrics. I-O analysis was once considered as a special case of linear programming and was often described in textbooks dealing with linear programming. For example, see Dorfman *et al.* (1958), and Heady and Candler (1958). The use of econometrics along with I-O has occurred quite often. Hudson and Jorgenson (1974) contributed an example of integrating both techniques.

The economic interdependence of the household sector with the rest of the economy within the I-O framework has attracted considerable attention since the late 1960s. Empirical studies closing and disaggregating the household sector are examined in Section 2.3. Section 2.2 gives a description of the I-O framework.

2.2 Input-Output Economics

Formulations of the general statement of the framework are found in many locations, for example, Chenery and Clark (1959) in *Interindustry Economics*. A more recent textbook by Miller and Blair (1985) reviews the foundations and extensions of I-O modelling.

The open I-O model developed by Leontief is described by a system of NI equations, where NI represents the number of industries. Based on the macroeconomic identity of national income, the I-O identity can be written as follow,

(2-1) $g = Ag + F.$

where g = a NI * 1 vector of industry output;
A = a NI * NI matrix of I-O coefficients;
F = a NI * 1 vector of final demand.

The final demand vector, F, is a composite of personal expenditure, investment, government expenditure, imports, exports and changes in inventory. The I-O features of the economy are represented by A. Reading across the rows in the A matrix shows where the output from producing industries is distributed to other industrial sectors and final demand categories. Similarly, the purchase of inputs by industries is read vertically in matrix A. The vector Ag expresses the dollar value of industrial intermediate demand. The identity of (2-1) says that total output goes into intermediate and final demand. Gross output arising from an exogenous change in final demand is given by:

(2-2) $g = (I - A)^{-1} F.$

where I = an NI * NI identity matrix;
$(I - A)^{-1}$ = the inverse of $(I - A)$.

The matrix coefficient, $(I - A)^{-1}$, will compute the direct and indirect requirements to satisfy the increase in F. The vector F is determined by the analyst and can be estimated using the composite of final demand for the

economy or other simulations. Econometric estimates can also be used to generate final demand vectors for macroeconomic analysis.

The model described above represents industry-by-industry interactions. This type of model is referred to as a square model. The framework developed by the I-O Division of the National Accounts of Statistics Canada (1987b) presents a commodity-by-industry interaction. This is called a rectangular model. A commodity refers to a particular grouping of goods and services produced in the economy. An industry (or sector) is defined as a collection of firms operating in a related sphere of economic activity. There are no rules restricting the number of commodities and the number of industries in a rectangular model. The number of commodities can be greater, equal or smaller than the number of industries specified in the model. Industries are incorporated independently of commodities. The rectangular model is more realistic, than a square model, as it takes into account that firms may produce a variety of commodities. The transaction tables of the rectangular format better represent the data on which they are based. Commodity market shares are depicted in the rectangular accounting framework. Market shares are not explicit and would be difficult to incorporate in a square model (Matuszewski, 1972).

The rectangular I-O model is drawn in the Input-Output Accounting Tableau, in Figure 2.1. This tableau displays the flows of commodities used as intermediate and primary inputs entering in the production process and to final

demand categories. It also records how much of each commodity is being produced by each industry. The units of flow measurement are dollars per year. Five matrices are represented in the accounting tableau, these are:

U: shows the flow of intermediate inputs by industry;
YI: displays the allocation of primary inputs by industry;
V: documents output flows;
F: allocates the flow of final demand categories;
YF: represents the flow of primary inputs used in final demand categories.

where NC = the number of commodities;
NY = the number of final demand categories.

In Figure 2-1, the Use matrix encompasses the U and the YI matrices. These matrices display intermediate and primary inputs respectively. The Use matrix reports the value of all inputs entering the production processes. The value of inputs used by industries is read vertically in the Use matrix. Total production costs (totals of U and YI) by industry are represented by vector g'.

The Make matrix is represented by matrix V. Reading the matrix horizontally gives the dollar value of commodities produced by each industry. The columns in the V matrix indicate the value of commodities produced by the industry. Vector q' is the summation, across industries, of commodity produced in the economy.

General equilibrium is an underlying assumption in I-O modelling. This implies that the total value of output in a given industry must equal total costs incurred in the production of goods in that industry. The vector column g, therefore, is the transpose of row vector g' (as indicated by the '). An

Figure 2-1 The Accounting Framework of Canadian Input-Output Tables

	Commodities	Industries	Final demand categories									Total
			PE	FCF	VPCW	VPCA	GGCE	X_D	X_R	-M	-GR	
Commodities		U	F									q
Industries	V											g
Wages & Salaries SLI NIUB Investment Income Subsidies Indirect Taxes Other Operating Surplus		YI	YF									
Total	q'	g'										

Final Demand Categories

PE - Personal expenditure on goods and services
FCF - Fixed capital formation, business and government
VPCW - Value of physical change in inventories, withdrawals
VPCA - Value of physical change in inventories, additions
GGCE - Gross government current expenditure on goods and services
X_D - Domestic import on goods and services
X_R - Re-exports on goods and services
M - Imports of goods ans services
GR - Government revenue from sale of goods and services

Source Statistics Canada (1981)

analogous relationship holds for q and q', where the total demand for a commodity equals its total supply.

2.3 Endogenized Household Sectors

Keynes postulates that when households' income rise due to changes in exogenous demand it is followed by increased expenditure on other goods and services produced in the economy (Keynes, 1953, Chapter 8, 9 and 10; Evans, 1969, Chapter 13; Asimakopulos, 1991, Chapter 4). The effects created by the increase in household consumption are induced by the increase in household income. In open I-O formulations like those described in the previous section, households' expenditures are exogenous to the model. Open models give the direct and indirect industrial requirements needed to satisfy the increase in exogenous demand. This is also the case because households are suppliers of primary inputs that are exogeneously specified. The mechanisms needed to measure the induced effects are incorporated by closing the I-O model to households or endogenizing households into the model. In the closed framework, personal expenditure and industries' purchases of labour constitute households' inputs to the economy. The income received by households are analogous to industry outputs. By closing the I-O model to households the induced effects (i.e. the reaction of households to increases in revenue) will be measured.

The endogenization of households in the I-O frameworks is, in principle,

a straightforward procedure. In the simplest specification, households' expenditure and income are each represented by a single row and column. Applications of models closed using this technique are reported in Johnson and Kulshreshtha (1981), Gould (1986) and Thomassin *et al.* (1992b)

The accuracy of the induced effect is contingent upon the specification of the household sector. The specification of the household sector as described above is a source of discussion in the literature. By endogenizing households using a single row and column, households are assumed homogenous across income groups. That is, the increase in revenue will be spent in exactly the same manner by all households ignoring initial expenditure patterns and the initial level and distribution of income. In regional science, it has long been recognized that, the smaller the economy the greater is the importance of carefully studying the effects of the household sector (Artle, 1961). The implicit assumption that households are spending their revenue in the same manner is counterintuituve and appears unsuited to many:

> "By virtue of their heterogeneity, households fail to conform to the fundamental conditions imposed upon any sector included amongst the endogenous categories - namely, that its coefficients should be independent of both the level and distribution of output." (Blackwell, 1978:367).

The assumption of homogeneity sets the average propensity to consume equal to the marginal propensity to consume. The specification of the household sector using this simple technique, which implicitly models homogeneity among households, is unrelated to economic facts. It is also in

conflict with economic theory. Theoretical details on the marginal propensity to consume as they relate to income and investment (and to the multiplier) are given in Keynes (1953, Chapter 8, 9 and 10); Evans (1969, Chapter 13) and Asimakopulos (1991, Chapter 4). Difficulties and pitfalls in the econometric estimation of the marginal propensity to consume are outlined in Evans (1969, Chapter 3).

The assumption of homogeneity among households is a limiting one. The extensions to the closed model discussed below consist of alternative specifications in the household sector. Round (1989) emphasizes the difficulty in classifying households in a convenient and realistic way, i.e. to relax the homogeneity assumption. The search for alternative specifications of the household sector is now a distinct area of research in I-O economics. There are several ways that researchers have pursued the proper specification of the endogenized household sector.

The pioneer alternative is the disaggregation of the total or the local expenditure by wage groups based on the residence of workers. This approach was used by Miernyk *et al.* (1967), Tiebout (1969) and Blackwell (1978). Miernyk's study disaggregated household consumption of local workers by income groups. The marginal propensity to consume of local workers was estimated using regression estimates. Average coefficients were used for incoming workers. The study concluded that the marginal propensity to consume was declining in higher income groups. Lower income groups tend

to spend a larger share of their increase in income on goods and services locally produced. Tiebout's (1969) model for the State of Washington was similar to Miernyk's model. A distinction between local and migrant workers was also established in the study conducted by Blackwell (1978). Their conclusions gave support to Miernyk's approach.

A similar approach was adopted by Martin and Henry (1982) in their study of the State of North Dakota. The household sector was divided into the farm and the non-farm population. Estimates of the marginal propensity to consume were obtained using a linear expenditure system and a quadratic expenditure system. While this approach is on several grounds innovative, Johnson and Capps (1984) have raised concerns about the interpretation and integration of the marginal propensity to consume estimates into the I-O model, as proposed by Martin and Henry (1982). The household sector was specified exogeneously to the model and did not measure the induced effect (Johnson and Capps, 1984; Henry and Martin, 1984). Instead of assuming the existence of a utility function, they suggested the use of the Almost Ideal Demand System (Deaton and Muelbauer, 1980) which is represented by a flexible functional form consistent with budget data.

Another alternative consists of disaggregating wage earners' expenditure by the income group of the wages recipient. Theoretical explorations were conducted by Miyazawa (1976) who defined relationships among different types of multipliers namely, the Leontief, Keynesian and Kalecki types. This

development provides a way of studying income distribution and propagation among household income groups. The approach outlined by Miyazawa (1976) has been influential among researchers. The development of redistributive multipliers (Kalecki multipliers) was the focus of recent works by Rose and Beaumont (1989) and by Bernat and Johnson (1991) on households' economic interdependence.

The idea of Miyazawa (1976) goes as follows:

(2-3) $$g = Ag + CVg + F.$$

where g, A and F are defined as above,
C = a NI * r matrix of consumption coefficients;
V = a r * NI matrix of income distribution coefficients.

The solution to the above identity is

(2-4) $$g = (I - A - CV)^{-1} F.$$

Let $B = (I - A)^{-1}$, then

(2-5) $$g = B(I - CVB) F.$$

Let $K = (I - VBC)^{-1}$.

By substitution into (2-5), we get

(2-6) $$g = B(I + CKVB) F.$$

In spite of rigorous theoretical contributions, difficulties remain in empirical investigation. For example, in many studies, unemployment benefits are treated as exogenous. Madden and Batey (1983) have demonstrated analytically that this specification of household income is unsuitable. Bernat

and Johnson (1985a,b) demonstrated empirically the importance of endogenizing the unemployment benefits in disaggregated models. When an unemployed head of household obtains employment, the increase in revenue is the difference between the two revenue sources. Treating unemployment as exogenous, the assumption was made that unemployed workers received no revenue, therefore introducing errors in the multipliers.

Another empirical difficulty is the definition of households themselves. In Miyazawa (1976) and in Weisskoff and Wolff (1981), all members of a given household are assumed to be workers in the same industry. Elsewhere, Dervis *et al.* (1982) allowed workers to be employed in different sectors but the number of workers in each household was fixed. As pointed out by Bernat and Johnson (1985a,b), a change in the level of employment indicates a change in the number of households being employed or unemployed. Bernat and Johnson (1985a,b) came up with a specification where workers in a household can be employed in different industries and can individually be employed or unemployed. However, workers in their original data were defined by occupations and several assumptions were used to relate occupations to industries.

There are different types of multipliers used in I-O analysis. The most common ones are output, income (or GDP) and employment multipliers. The Type I multiplier is the ratio of the direct and indirect effects to direct effects. Type I output multipliers are found for each industry by summing the columns

in the Leontief inverse. Type II output multipliers are computed by taking the direct, indirect and induced effects and by dividing them by the direct effects. Type II multipliers are found by summing down the columns in the Leontief inverse, excluding the household sectors. The household sector is excluded for the computation of Type II multipliers because it would result in double counting. See Miller and Blair (1985, pp. 102-110) for greater details on multiplier formulation. Johnson and Kulshreshtha (1981) offer an in-depth analysis of multipliers, of their use and misuse, and of their limitations in I-O analysis. Asimakopulos (1991, Chapter 4) examines the theoretical shortcomings of multipliers. Using his disaggregated household sector, Miernyk *et al.* (1967) developed Type III multipliers, analogous to Type II multipliers from standard models. Type III multipliers were found to be smaller than Type II multipliers. Madden and Batey (1983) have developed Type IV multipliers, which take into account the differential between employed and unemployed workers. Type IV are numerically smaller than Type II but greater than Type I.

2.4 Summary and Conclusion

The I-O framework has been particularly useful to the study of macroeconomics. As was seen, a lot of effort has been devoted to the study of the household sector. Theoretical devices seem to precede the availability of appropriate data for support. Two major approaches to the specification of

the household sector were outlined. The focus of the extensions have been mostly concerned with a specific aspect of the static model.

Chapter 3

RESEARCH METHOD

3.1 Introduction and Overview

The research methods presented in this chapter possess commonalities and distinctive features with many of the references reviewed in Chapter 2. Technical aspects of modelling the I-O framework based on the Statistics Canada's model are discussed in detail throughout Section 3.2. Descriptive aspects of the I-O model are introduced in the next section. Procedures to endogenize the household components in the model are the objects of Section 3.3. After a mathematical description of the model, the assumptions and their implications are reviewed in Section 3.4.4. Section 3.4.3 lists the output indicators used for economic analysis. Finally, Section 3.5 details the research strategy, the hypotheses to be tested and the questions to be answered.

3.2 Description of The I-O Model

The current research will use the Statistics Canada I-O model disaggregated by Agriculture Canada for policy analysis (Thomassin *et al.*, 1992a). The main relationships of the model were reviewed in Section 2.2, where the accounting tableau was presented.

3.2.1 Specification of Industries and of Commodities

The Statistics Canada I-O Use and Make matrices contain 50 industries at the medium level of aggregation. [Technical details on aggregation levels are

available in Statistics Canada (1988b).] The final demand matrix has 28 categories. In a previous research project, the agricultural sector was disaggregated into 12 farm types. Returns from the 1986 Census of Agriculture and other special tabulations were used to make these amendments to the model (Thomassin *et al.*, 1992a). The agri-food industries were expanded from 3 sectors at the medium level to 16 industries at the link level of aggregation. The name and number of industries specified in the model are listed in Appendix A. In total, the model disaggregated for agriculture, Agriculture Canada's (AC's) model, comprises 74 industries.

The Statistics Canada I-O model at the medium level of aggregation has 100 commodities. The open model contains 92 of these commodities (intermediate inputs). The remaining commodities are primary inputs exogenous to the model. AC's model has an extended number of agricultural and agri-food commodities. There are 23 agricultural commodities and 66 agri-food commodities specified in the model. Commodity names and numbers are detailed in Appendix C. Overall, there are 178 commodities in the model.

3.2.2 Model in Producers' Prices

The I-O accounting framework is available in both producers' prices and purchasers' prices. Differences between the two options reside in the specification of distinct commodity margins and taxes in the former case. When commodities leave the industrial plant, a series of margins and taxes are added

to the price of the product before consumers buy them. Producers' prices reflect the price at the producers' doors.

AC's I-O model was developed in producers' prices. Included as separate items are seven commodity margins and taxes, supplying a balanced accounting between producers' prices and purchasers' prices. Margins and taxes are added to commodities #151, #152, #157, #158, #159, #168 and #173 (see the list of commodities in Appendix C).

3.3 Endogenization of Households' Components in the I-O Framework

Studies looking at the economic impact of changes in household income on expenditure patterns have used an endogenized household sector. A model with endogenized personal expenditure and income-related primary inputs is a mean of studying the intensity of industrial activity and changes in the level of employment in an economy. The next section details how to endogenize personal expenditure and relevant primary inputs in the AC's I-O model. The procedure to endogenize personal expenditure categories are based on the suggestions from the Structural Analysis Division of Statistics Canada (1981, Chapter 4) in the revised edition of the *User's Guide to Statistics Canada Structural Economic Models*. This method assumes homogeneity among households and is referred to as Model 1. Another framework based on Model 1 will be used to disaggregate the endogenized household sector by income groups. The disaggregated framework is called Model 2. Both models are

described below.

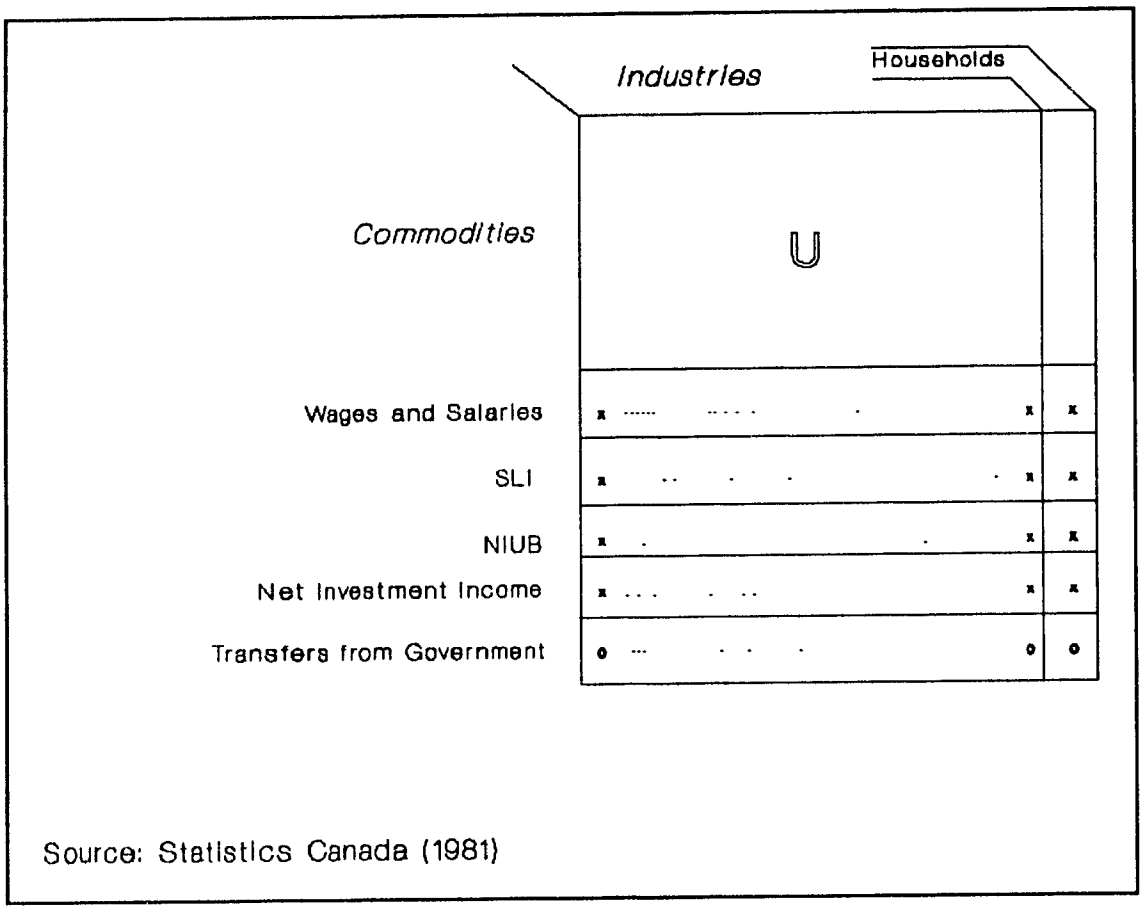
3.3.1 Model 1

The closed version of the AC's model includes five primary inputs or household outputs (wages and salaries, supplementary labour income (SLI), net income of unincorporated businesses (NIUB), investment income and government transfers) and 13 personal expenditure categories aggregated into one category (see Appendix B for a list of final demand categories). The closed model is extended by five commodities and by an extra 'industry' of personal expenditure (resulting from the aggregation of the 13 categories), and is called Model 1.

The structure of the closed model resembles the one of the open model. The extra sector created to reflect households' expenditure and income flows is analogous to the other industries in the model. In the augmented U matrix, elements of personal expenditure are interpreted as 'inputs' used by households. Wages and salaries and other revenue commodities in the V matrix represent outputs 'produced' by the household sector.

The U matrix is augmented by one column and five rows, as depicted in Figure 3-1. Entries in the household sector reflect the flow of expenditures by households on the goods and services in the economy. The five extra rows refer to the consumption of labour and capital items employed or entering the production process of all industries and of the household sector. The V matrix

Figure 3-1 Augmented U Matrix

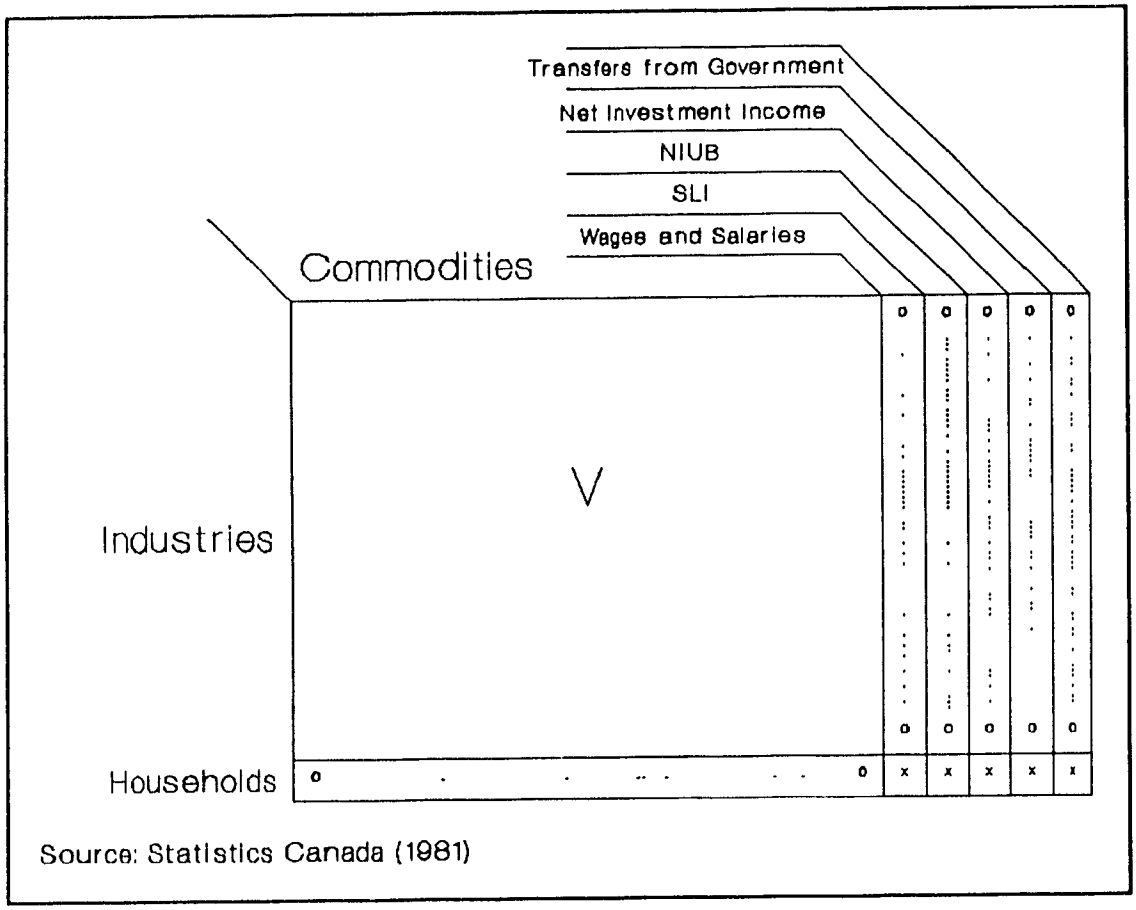


Source: Statistics Canada (1981)

will be amended in the same fashion as the U matrix. The industry row shows entries of zeros across commodities because households are exclusive 'producers' of Wages and Salaries and of other outputs (see Figure 3-2). Industries neither produce wages and salaries nor any other of the endogenized income components. Entries in the household sector correspond to households' output values of wages and salaries, SLI, NIUB, investment income and government transfers. The I-O model closed to households' income also includes an extra primary input in the YI matrix: net personal savings. Net personal savings is found by subtracting the household sector total in the V matrix from the total in the U matrix. The difference between household income and household expenditure is net personal savings. This commodity is used to balance the Use with the Make matrix in the household sector.

Table 3-1 gives an outline of changes occurring in the Make, Use and Final Demand matrices after endogenizing the household sector. Before and after closing the model, both the Use and Make matrices exhibit the same commodity totals (what is produced equals what is consumed due to the equilibrium assumption). In the Make matrix, the sum of wages and salaries, SLI, NIUB, net investment income and government transfers (found by summing up these amounts in the Use and Final Demand Matrices) equals personal expenditure plus net personal savings in the Use matrix.

Figure 3-2 Augmented V Matrix



Source: Statistics Canada (1981)

Table 3-1 **Changes in the Value of Flows in the Make, Use and Final Demand Matrices due to adjustments in Closing the Model to the Household Sector, 1986 Model [1] (in millions of dollars).**

ITEMS	Make	Use	Final Demand
Totals as published	783,236.1	783,236 1	504,631 2
Changes due to Closed Model:			
Wages and Salaries:			
Use Matrix	181,571 6		
Final Demand Matrix	66,319.4		
Supplementary Labour Income:			
Use Matrix	18,136.0		
Final Demand Matrix	8,730.1		
Net Income of Unincorporated Business:			
Use Matrix	33,048 5		
Final Demand Matrix	0.0		
Investment Income:			
Use Matrix	54,921 0		
Final Demand Matrix	314.0		
Government Transfers:			
Use Matrix	0.0		
Final Demand Matrix	61,596 0		
Personal Expenditure on Goods and Services:		296,809 7	(296,809 7)[2]
Net Personal Savings		127,827 0	
New Totals	1,207,872 8	1,207,872 8	201 861 5

Notes:
1 - Statistics Canada (1988b)
2 - Parentheses indicate a negative number

For the Make matrix, investment income was found in the Income and Expenditure Accounts (IEA) (Statistics Canada, 1989a, Table 4). Values of

investment income across industries were determined based on the distribution of other operating surplus (an exogenous primary output) in each industry and in the household sector. The resulting value of investment income in each industry is thus subtracted from other operating surplus.

Estimates of Government transfers were also taken from the IEA tables (Statistics Canada, 1990a, Table 56-65). Government Transfers is an outlay of the government sector located in exogenous final demand categories. Thus, no figures are reported in the U matrix as government transfers. Details of adjustments on a per commodity basis in the Use and in the Make matrix for Model 1 are available in Table A3-1, in Appendix D.Wages and salaries and SLI represent 64.7 percent of total household revenue. Government transfers are the second source of household income with 14.5 percent. Net investment income accounts for 13 percent and NIUB amounts to 7.8 percent. More recent estimates from the IEA show that these income shares have remained stable (Statistics Canada 1990a, Table 70-93).

3.3.2 Model 2

Economists have expressed dissatisfaction with household sectors endogenized using the technique of Model 1. Several alternatives for incorporating households' economic contributions within the I-O framework were suggested (See Section 2.3).

The alternative suggested here consists of disaggregating Model 1 by

income group to create Model 2. In Model 2, the assumption of homogeneity among households will be relaxed. Both personal expenditure and primary inputs will be disaggregated to account for income distribution and expenditure patterns. This solution is similar to those suggested by Stone (1985), Bernat and Johnson (1985a,b) and Rose *et al.* (1991) for square models. Rose and Beaumont (1989) emphasized that this alternative does not estimate the marginal propensity to consume. Rather, it considers the economic behaviour of marginal income groups. Estimating the marginal propensity to consume is still feasible, but not without difficulties. There are serious difficulties associated with the assumptions behind estimation techniques (regression analysis) and with the choice of functional forms (Evans, 1969, Chapter 3). More importantly, the interpretation and compatibility of these estimates within the I-O model are subject to controversies (more details in Johnson and Capps (1986)).

The construction of Model 2 is interesting in several regards. The Canadian I-O framework is rectangular, where the number of commodities is greater than the number of sectors. This is important for the modelling of the household sector because the number of household's outputs is larger than the number of household sectors. Wages and salaries and NIUB will have 11 individual income groups each. There are 11 government transfers' categories, 6 SLI categories and 1 investment income. This format takes into account a large number of sources of household income in Canada.

Wages and salaries recipients are specified individually in the model. Each individual, whether a member of an economic family or unattached, is reported separately (i) in the industry employed, (ii) in the wages and salary group, and (iii) in the total household income group belonged to. For example, a worker in the brewing industry may receive a salary of $43,000 and belong to a household income group of more than $59,999. Then, other member(s) of the household would be earning at least $17,000, for a family total of at least $60,000. This framework is very detailed and offers greater flexibility in the modelling of the household sector. This method is more realistic than the one based on income received by the head of the household or only including unemployment benefits.

The data base possesses interesting features as well. For example, wages and salaries and NIUB are reported for each industry based on the 1980 SIC codes. Other studies have used information where wages and salaries were reported by occupation (Bernat and Johnson, 1985a,b). These studies used a series of assumptions based on extraneous information to allocate occupations by industry. No transformations were imposed on the data to disaggregate these items in this study. The distribution by income groups was prorated to I-O control totals. Similarly, personal expenditure were disaggregated by economic-family income groups. Each income group possesses its own pattern of commodity expenditures. The disaggregation of the household sector is detailed in Chapter 4.

3.4 Mathematical Formulation of The Model

The mathematical formulation of the rectangular model is outlined in several locations. For examples, see the publications of Statistics Canada (1981, Chapter 1), Johnson and Kulshreshtha (1981), Thomassin and Andison (1987).

3.4.1 Manipulation of the Accounting Framework

The aim of the accounting framework is to provide relationships that can be used to generate an impact matrix capable of estimating the impact of a change in final demand on the economy. Two relationships are considered in the model:

1 - The allocation of commodities by intermediate and final demand categories, and

2 - The level of commodity output or the domestic supply of commodities.

The first relationship establishes that:

(3-1) Value of the Total Demand for Commodities = Value of The Intermediate Demand for Commodities + Value of The Final Demand for Commodities

$$q = Ui + Fi.$$

where i = to a vector in which all elements are equal to one. These vectors are used to sum matrix rows and column.

The second relationship says that:

(3-2) The Total Value of Industrial Output = The Summation of the Value of the Industrial Outputs by Commodity

$$g = Vi.$$

Two important assumptions must be made with respect to the production process used in the economy. First, intermediate inputs used are directly proportional to outputs produced. In mathematical terms, this assumption can be written as follows:

(3-3) $U = B\hat{g}.$

where B = an NC * NI matrix of technical coefficients;

$\hat{}$ = a diagonal matrix.

Similarly, we require primary inputs to be proportional to their respective industrial output. In mathematical terms:

(3-4) $YI = H\hat{g}.$

where H = an NY * NI matrix.

The second assumption says that commodity-output levels are related to fixed market shares. This assumption can be expressed in matrix notation as follows:

(3-5) $V = D\hat{q}.$

where D = an NI * NC matrix of market-share coefficients.

The above relationships are put into a mathematical economic model to

estimate the impact of a given change in final demand.

Taking equation (3-2), and substituting for Vi, in equation (3-5):

(3-6) $g = Dq$ (Note: $g = Vi = Dq$).

Substituting for q using equation (3-1):

(3-7) $g = D(Ui + Fi)$.

Substituting for U using equation (3-3):

(3-8) $g = D(Bg + Fi)$.

Rewriting:

(3-9) $g = DBg + DFi$.

(3-10) $g - DBg = DFi$.

(3-11) $g = (I - DB)^{-1} DFi$.

where I = an NI * NI identity matrix.

Equation (3-11) gives the production requirements to satisfy the final demand on an industry basis.

3.4.2 Leakages in the Economy

The model developed to this point does not consider imports, government production and inventory withdrawals of commodities used as intermediate or primary inputs in the estimation of the final demand vector. To take these into account, matrix Fi can be disaggregated into many final demand categories.

(3-12) $Fi = f + E + X - M - A - N$

where

f = an NC * 1 vector of the values of final demand excluding re-exports, exports, imports, government production and inventory withdrawals;

E = an NC * 1 column vector of the values of re-exports;

X = an NC * 1 column vector of the value of commodity exports;

M = an NC * 1 column vector of the value of commodity imports;

A = an NC * 1 column vector of the value of government production of commodities;

N = an NC * 1 column vector of the value of inventory withdrawals.

Considering the leakages in the economy adds greater precision to the results of the model. Imports, government production and inventory withdrawals are assumed to be a fixed proportion of the final demand categories. Putting this assumption into mathematical notation for leakages yields:

(3-13) $M = \hat{\alpha} (Bg + f + E)$

(3-14) $A = \hat{\tau} (Bg + f + X)$

(3-15) $N = \hat{ß} (Bg + f + X)$

where

$\hat{\alpha}$ = an NC * NC diagonal matrix of coefficients whose elements are a ratio of imports to the commodity used;

$\hat{\tau}$ = an NC * NC diagonal matrix of coefficients whose elements are a ratio of government production to commodity used;

$\hat{ß}$ = an NC * NC diagonal matrix of coefficients whose elements are a ratio of inventory withdrawals to commodity used.

The impact of a change in final demand on the economy can be estimated taking into account the leakages occurring in the economy.

From equation (3-8), $g = D(Bg + Fi)$.

Substituting for Fi using (3-12) and for M,A and N using (3-13), (3-14) and (3-15), we obtain:

(3-16) $g = D\,[Bg + f + E + X - \hat{a}(Bg+f+E) - \hat{ß}(Bg+f+X) - \hat{\tau}(Bg+f+X)]$.

Rewriting

(3-17) $g = [I - D(I-\hat{a}-\hat{ß}-\hat{\tau})B]^{-1}\, D[(I-\hat{a}-\hat{ß}-\hat{\tau})f + (I-\hat{a})E + (I-\hat{ß}-\hat{\tau})X]$.

The industrial output required to satisfy a change in final demand is defined by equation 3-17 and is called the direct and indirect effect on the economy.

The solution to the closed rectangular I-O model does not involve more mathematical relations than the ones described from equations (3-1) to (3-17). However, parameters associated with households must be inserted into the B and D matrices and leakage coefficients. Then, the (NI + 1)th element in the augmented g vector represents households' economic activity. The portion of the q vector referring to households' outputs in the augmented closed model is the (NC + 1)th to the (NC + 5)th commodities.

3.4.3 Output Indicators

Equation (3-17) describes the industrial output needed to satisfy the increase in final demand, considering the leakages. After closing the model, vector g estimates the direct, indirect and induced effects. It is possible, using the value of industrial output, to approximate the impacts on GDP at factor cost and on paid employment. GDP and employment coefficients must be developed. For a given sector, a coefficient is found by dividing GDP at factor cost by the total industrial output. GDP is the sum of wages and salaries, NIUB, SLI and of operating surpluses. Similarly, a paid employment coefficient is found by dividing the number of paid jobs in a sector by the total industrial output for that sector.

Direct, indirect and induced effects are found by multiplying vector g by a diagonal matrix of GDP or of paid employment coefficients. The result is a vector in which each cell represents the direct, indirect and induced effects on GDP or on paid employment. With the open model, only the direct and indirect effects are approximated due to the absence of households' components.

Type I and Type II output, GDP and employment multipliers of a given change in final demand can be computed using the following formulae.

$$\text{Type I Multiplier} = \frac{\text{Direct + Indirect Effects}}{\text{Direct Effects}}$$

$$\text{Type II Multiplier} = \frac{\text{Direct + Indirect + Induced Effects}}{\text{Direct Effects}}$$

Type I output multipliers on an industry basis are also found by summing the columns in the Leontief inverse [$g = (I - DB)^{-1}$] of the open I-O model. Type II output multipliers are found by summing down the columns in the Leontief inverse of the closed model, excluding the rows corresponding to the household sector. The household sector is excluded because it would result in double counting (Johnson and Kulshreshtha, 1981).

3.4.4 Assumptions of the Model and Their Implications

A look at the most important assumptions underlying the I-O model is important for interpreting the results from the model. Assumptions used in I-O modelling are explored by Chenery and Clark (1967, Chapter 2.D and 6) and Thomassin and Andison (1987); see also Input-Output Division (1991). An I-O model includes information on the flow of goods and services used as inputs in the production process, and the total output produced in the economy. It is assumed that the specification of industries and of commodities adequately reflects what is produced in the economy. Moreover, the industry content is also assumed to include all firms contributing to the output of that industry. These assumptions are essential since I-O models study economic interdependence among industries and commodities.

The economy described by the model is assumed to be in equilibrium.

In an I-O context, the equilibrium assumption implies that total demand equals total supply and that each sector's total revenue equals its total cost. Stocks and capital are exogenous to the model. Transactions are described in terms of monetary flows and take place within a static framework. Economic effects associated with changes in final demand or in exogenous change in income are assumed to be at a new equilibrium position. The result of comparative statics is the study of alternate equilibrium positions at the same point in time, not economic change: "[It] is important to be aware that theory often tries to analyse *changes* by making *comparisons* between different equilibrium positions." (Asimakopulos, 1978:47, italics in the original). As a result, disequilibrium situations cannot be studied by means of an I-O model. Moreover, because of the static nature of the model, results do not relate to any time frame: "The comparison of equilibrium positions does *not* indicate how the values of the variables being studied change *in time* from one equilibrium position to another." (Asimakopulos, 1978:50, italics in the original). Forecasts or predictions based on I-O analysis are possible only by invoking *ceteris paribus* clauses.

The assumption underlying constant technology and proportional exchanges among industries have important implications. The constant technology assumption implies that each input entering the production process is in fixed proportion to the level of output produced in a given industry, whatever the demand. As relative prices vary, the coefficients do not change,

implying that quantities change enough to offset price changes. In addition, the constant technology assumption is not constrained by the resources required to satisfy increases in final demand.

Fixed market shares is another important assumption. If the final demand for a product is stimulated, the supply will come in fixed proportion from all industries producing that good regardless of the nature of the increase.

If leakages are considered, they enter the production process in fixed proportions for all industries concerned. The supply of inputs arises from the same source, either domestic or foreign, in a predetermined combination. Again, changes in relative prices or exchange rates are ignored by the model. Producers do not adjust to new expenditure patterns.

I-O transaction tables are based on a set of constant relationships. More precisely, technology and exchange among industries are held constant. I-O tables represent a 'picture' of the economy at a given period, normally one year. When equations are solved, these characteristics are assumed to have remained unchanged. I-O tables may not be credible approximations of the structure of the economy and technology and market shares if these have had substantial changes from the model's base year.

The assumptions described above underlie the principle of 'linearity' implied by the I-O model. A linear model exhibits relations in which values are proportional.

In an open model, the reaction of households is not included. For

example, consumer expenditures, spending on capital goods and equipment (investment from corporate profits) and government activities are assumed exogenous. Hence, the results of an I-O analysis include direct and indirect effects of changes in final demand and are therefore insufficient. By closing the model to households, more effects are recorded. The induced effects or Keynesian multipliers are generated as consumers spend their new income after receiving an increase in revenue.

The structure of the model closed to households is identical to that of the open model. All the assumptions discussed above apply, except that closing the model involves its own set of assumptions. These vary according to the technique employed.

The technique outlined in Section 3.3 assumes homogeneity among households. A consequence of this assumption is the average propensity to consume is equal to the marginal propensity to consume (the reasons being that there is only one vector of personal expenditure and that endogenized primary inputs each represent a different category). As stated by economic theory, the propensity to consume is constrained by the level of income and by economic conditions. A model closed under this assumption overlooks the fact that different income streams result in different expenditure patterns and this influences the magnitude and the accuracy of the induced effect. This assumption is known to overestimate the economic contribution of consumption by higher income groups and to underestimate the consumption

by low income groups. A model disaggregated by income groups would be more sensitive to distributional effects.

3.5 Research Strategy and Hypotheses

To study the usefulness and effectiveness of disaggregating the closed model, the following research strategy was followed. First, it was hypothesized that Model 1 will underestimate the economic impacts of an increase in exogenous wages and salaries to the lower household income groups. It was also hypothesized that Model 1 overestimates the economic impacts of an increase in the exogenous wages and salaries of the high income groups. These hypotheses were studied by shocking the appropriate wages and salaries category in Model 1 and 2. Such changes in exogenous wages and salaries were also studied by looking at differences in the agriculture and agri-food industries as these are of considerable interest to agricultural economists. The results from the two models were then compared by focussing on economic indicators such as the direct, indirect and induced effects on output.

The second aspect to be investigated was the impact of an increase in final demand. Three sectors were studied (namely, the agriculture, agri-food and petrochemical product industries) with a simulation to indicate the relative economic importance of each sector. The simulation revealed the influence of disaggregated wages and salaries and NIUB across these industries. Economic

indicators here were the direct indirect and induced effects on industrial output, on GDP at factor cost and on paid employment. The open version of the model was used to generate the direct and indirect effects on industrial output, on GDP at factor cost and on paid employment. This simulation clarifies whether the disaggregation of primary inputs (wages and salaries and NIUB) influences the results. The difference between Model 1 and Model 2 when using a change in final demand should be less important than a change in wages and salaries because primary inputs represent a smaller fraction of all inputs in these industries.

The Leontief inverse was used to generate Type I and Type II output multipliers. Type II multipliers were generated using both Model 1 and Model 2. The empirical evidence will be presented in Chapter 5. All computations will be conducted on the IBM-PC (PS/2) using GAUSS, version 2.1. GAUSS is a software package designed for matrix operations. This choice was guided by convenience and ease of use [see Cloutier (1992a) for more details]. Three different program formats were designed. In Appendix E, a sample of each format is given. The first format called MARGINS.PRG is used to re-adjust the final demand vector in either producers' or purchasers' prices. Adjustments are made based on what is needed. The second program format called IMPACT.PRG computes the impact matrix used for the analysis. The third program ANALYSIS.PRG estimates the output indicators.

3.6 Summary and Conclusions

This chapter has reviewed the research method used. Techniques suggested by the I-O division to close the Canadian I-O model were outlined. The assumptions used and their implications in the modelling and manipulation of the accounting framework were discussed. It was emphasized that additional assumptions are needed when closing the model using different techniques. Two particular techniques for closing the model with respect to households are identified. The research strategy had two parts. The first part studies changes in exogenous wages and salaries while the second part investigates the impact of an increase in final demand for products of three industrial areas. The construction of the disaggregated model closed to households, Model 2, is described in Chapter 4.

Chapter 4

MODEL DEVELOPMENT

4.1 Introduction and Overview

This chapter outlines the data used to close and to disaggregate the household sector in the I-O model. The steps involved in the disaggregation of the U and V matrices are also detailed. A summary and conclusion follow in section 4.4.

4.2 Development of The Household Sector

4.2.1 Model 1

The endogenization of the household sectors' economic contribution into the I-O framework was outlined in Chapter 3, Section 3. The data sources are available through the Input-Output Division of Statistics Canada. Information to extend the U and V matrices is published in the I-O Use, Make and Final Demand tables (Statistics Canada, 1988b).

4.2.2 Model 2

The disaggregation of the household sector by income groups requires data not available in the National Accounts Division (see Vaillancourt, 1985, for a list of detailed data sources on income in Canada). Data sources on specific items required to disaggregate the household sector are available in other Statistics Canada divisions such as the Census Operations Division, the Labour

Force Division, the Household Surveys Division, etc. Statistics Canada uses a large number of information sources to build the Income and Expenditure Accounts (IEA). Definitions, concepts and methods are important because differences between the estimates in the IEA will differ from sources used to disggregated the household sector. Users should be aware of the strengths and weaknesses of the other secondary sources used to disaggregate the household sector in Model 2.

The Canadian I-O model is based on estimates generated by the Income and Expenditure Accounts Division of Statistics Canada. It follows that definitions, sources, concepts and methods used in the I-O model are identical to the ones of the Income and Expenditure Accounts Division. The *Guide to the Income and Expenditure Accounts* (IEA) (Statistics Canada, 1990b) and the user's guide for the FAMEX surveys (Statistics Canada, 1989c) are useful documents to sort out potential sources of differences. In **Primary Inputs in the U Matrix and Household's Outputs in the V Matrix** (Section 4.2.2 below), the Census *Dictionary* (Statistics Canada, 1987a) and the *Census Handbook* (Statistics Canada, 1988a) are also handful. Listed below are many of the other secondary data sources used to disaggregate components of the household sector. Information sources, definitions, concepts and method are outlined with the development of the U and V matrices of Model 2.

4.2.2.1 Personal Expenditure in the U Matrix

The Household Survey Division occasionally collects detailed information on family expenditure in Canada. In 1986, a Family Expenditure (FAMEX) Survey was conducted throughout Canada (Statistics Canada, 1989c). A similar survey was conducted on Family Food Expenditure (FOOD) for the same year (Statistics Canada, 1989b). These surveys constitute the most detailed source of information available on families' personal expenditure. In the development of Model 2 these surveys were used to disaggregate the vector of personal expenditure in the 1986 AC's I-O model.

The FAMEX and FOOD surveys report family expenditure on goods and services. Expenditures are grouped by categories: food, shelter, household operations, household furnishing and equipment, clothing, transportation, health care, personal expenditure, recreation, reading material, education, tobacco products and alcoholic beverages, security, miscellaneous, gifts and contributions and various items not purchased. The published version of the surveys reported expenditures based on different criteria such as province, city size, family income groups, etc.

Values of personal expenditures are endogenized for the U matrix into 11 income categories. The 11 income categories specified in the FAMEX and FOOD surveys are listed in Table 4-1. Columns in Table 4-1 report the number of families and unattached individuals who responded to the surveys and the estimated number of families in each category.

Table 4-1 Income Categories and Number of Families in Surveys

	1986 FAMEX Survey[1]		1986 FOOD Survey[2]	
Income categories	Sample	Estimated	Sample	Estimated
1. < $10,100	1,091	946,300	1358	1,295,310
2. $10,000-14,999	1,145	927,590	1203	1,022,270
3. $15,000-19,999	1,027	848,420	1065	913,700
4. $20,000-24,999	915	726,260	936	793,340
5. $25,000-29,999	953	817,780	976	853,370
6. $30,000-34,999	911	752,110	996	851,280
7. $35,000-39,999	827	681,250	845	679,730
8. $40,000-44,999	718	628,310	778	679,600
9. $45,000-49,999	610	576,540	557	460,000
10. $50,000-59,999	934	841,490	819	671,010
11. > $59,999	1,223	1,163,320	1086	942,880
Total	10,356	8,849,370	10,919	9,379,590

Source: (1) Statistics Canada (1989c)
(2) Statistics Canada (1989b)

Goods and services listed in the FAMEX survey were allocated to the 134 commodities specified in the personal expenditure vector of the I-O model. The *Principal Commodity Classification Codes* were useful to allocate the FAMEX the FOOD data to I-O commodities. A list of I-O commodities at the link level of aggregation was also useful (Statistics Canada, 1988b:53-61). Table A4-1, Appendix F, lists which I-O commodities were allocated to FAMEX commodities. It was possible to directly disaggregate 99 out of the 134 commodities with imputed values in the personal expenditure sector of the U matrix. The 99 commodities represent 79 percent of total value for the commodities to be allocated (including commodity margins and excluding household related primary inputs). Because of the commodity coverage and

specification, the remaining 40 commodities were allocated using proxies. These proxies were estimated by combining other FAMEX commodities allocated to I-O commodities (see Table A4-2, Appendix G, for a list to the construction of proxies).

Average expenditure figures given in the FAMEX and FOOD surveys were multiplied by the number of estimated families in Canada in each income group. In the FOOD survey, the values reported were based on the average value per week. The average values were multiplied by 52 to transform them to an annual basis and then multiplied by the number of estimated families as reported by the FOOD survey. The expenditure by income category for each commodity is prorated to the I-O control totals in purchasers' prices using the FAMEX survey distribution. The margins were reallocated to the commodity margins defined in the model in producers' prices. Table A4-3, Appendix H, details the values of personal expenditure in the augmented U matrix for each I-O commodity, by household income groups.

Differences between the FAMEX and I-O data amount to 3 percent. Note that relative differences on a commodity basis are often larger. Most of the statistical discrepancies can be rationalized by comparing definitions, concepts, sources and methods used in generating data. [See Cloutier (1992b) for more details of differences on a commodity basis.]

A broader population of personal expenditure categories is found in the I-O accounts as compared to the FAMEX survey. In the I-O model, personal

expenditures include two groups. The first group covers individuals, households and private nonprofit organizations, e.g., private schools, universities, labour unions, religious groups, charitable organizations, professional associations, private pension funds, etc. The second group comprises unincorporated businesses, e.g., family farms, lawyers, notaries, physicians, other professionals, etc. A family is defined in the FAMEX survey as a group of individuals, related or not, sustained by at least one income source. This definition is similar to that of 'economic families' used elsewhere at Statistics Canada. In the Census Dictionary, 'Private Households' are defined as a collection of 'economic families' and 'unattached individuals' (Statistics Canada, 1987a). Estimates in the FAMEX survey do not cover populations located in Canadian Territories, individuals living in institutions, members of religious orders, Canadians living on Indian reserves or Canadians who emigrated abroad. These groups are included in the IEA.

The user's guide to the FAMEX survey reports several conceptual differences with respect to the national accounts data. For instance, some items are imputed values in the IEA estimates but not in the FAMEX survey. These are "the cost of farm products consumed directly in farm households, the cost of food received by employees in lieu of wages and the value of services for which banks and other financial institutions make no specific charge." (Statistics Canada, 1989c:181-2). The IEA does not use the fees paid by users when the service is offered by a nonprofit organizations. It uses an

estimate of the operation costs. This is the case for expenditures on education, where the FAMEX survey reports the tuition fees paid by users while IEA reports operation costs.

Besides the 1974 version of the FAMEX survey, the personal sector data in the IEA are generated from an array of annual reports, ad hoc studies and unpublished data. Detailed information about exact sources and methods used to construct the personal sector data in the IEA is available in the *Guide to the Income and Expenditure Accounts, Sources and Methods Series* (Statistics Canada, 1990b). A list of more than 75 surveys, studies or statistical reports on specific commodities is given in Appendix I, pages 128-130, of the guide. Expenditures on food, clothing, footwear, furniture, appliance, household furnishings and supplies, and recreational equipment are derived as described above.

Estimates of commodities such as motor vehicles (including replacement pieces), energy products (gasoline, electricity, natural gas, etc.), alcohol and tobacco products are derived using individual studies. Values of personal expenditures on these commodities are obtained from their own commodity statistics, along with the relevant consumer price index. Typically, the quantity sold is multiplied by the average retail price of these items.

The estimates of personal expenditures on services are based on several sources. Expenditure on cinemas, theatres, spectator sports, laundry cleaning,

motor vehicle rental and household services are found using annual surveys of service institutions.

Many differences in populations, definitions, concepts, sources and methods between the FAMEX surveys and the IEA were outlined above. The FAMEX survey is the only extensive data source available in Canada on consumer expenditures detailing the information by income categories. The FAMEX survey covers the expenditure of unincorporated businesses as well. As discussed in the *Guide to the Income and Expenditure Accounts,* unincorporated businesses are included in personal expenditure because it "is not possible from a statistical standpoint to distinguish between the expenditure for personal use and those consumed in a business context." (Statistics Canada, 1990b:43).

4.2.2.2 Primary Inputs in the U Matrix and Household's Outputs in the V Matrix

There were five endogenized primary inputs and households' outputs to be disaggregated. Wages and salaries and net income of unincorporated businesses (NIUB) were first allocated to individual groups and then disaggregated by household income groups in the U and V matrices. Values of Supplementary labour income (SLI) were distributed to the different sectors in the U matrix and allocated by household income groups in the V matrix. Sources of government transfers were identified and disaggregated in the V matrix. Investment income kept its commodity dimension and was allocated

by household income groups in the U and V matrices. The following sections detail the disaggregation procedures used for each primary input and household's output.

(A) Wages and Salaries (commodity #176)

The first data source used to disaggregate wages and salaries was the 1986 Population Census. Published data from the Census Operations Division on income are based on occupations, not industries. The disaggregation was performed using three variables and normally Statistics Canada publishes tables displaying only two variables. It proved impossible to obtain the appropriate information from published sources. As a result, a special tabulation was purchased from the Census Operation Division. This table, (Statistics Canada, 1991a), was designed to be as compatible with the I-O model. Wages and salaries were organized on an industry basis. These industries were defined using the 1980 Standard Industrial Classification Code (1980 SIC). More detail on the industry coding is available in Statistics Canada (1986).

Wages and salaries were not available by farm types. The Census Operations Division's data base can only supply information on the agricultural sector at a more aggregated level. This aspect is especially important because of 12 farm types specified in the AC's I-O model. This gap was filled by information from a special tabulation by the Agricultural Census Operations (Statistics Canada, 1992a). Both the U and the V matrix could be disaggregated using the information from the special tabulations. They display,

by household's total income group, individual wages and salaries by income groups and by user specified industries. There are 60 industries in the Census tables allocated to 63 industries in the I-O model. The 12 farm types were disaggregated with information from the Agricultural Census. There are 11 specified household income groups identical to the ones used to disaggregate personal expenditures (see Table 4-1) and 11 wages and salaries groups. Both the counts of individuals who received wages and salaries and the average dollar value of wages and salaries are displayed in the special tabulations. The total amount for wages and salaries was found by multiplying counts by the average value of wages and salaries. To build wages and salaries in the U matrix, the income distribution was prorated to the I-O control totals for each industry. Values of wages and salaries in the U matrix are detailed on an industry basis in Table A4-4, Appendix H.

The households' output of wages and salaries can be found in Table A4-5, Appendix H. Values in the V matrix were found by summing individual wages and salaries in each group across both the augmented U matrix and final demand categories. The total wages and salaries in the U and F matrices (q) for each group then becomes the new control total in the V matrix (q') for disaggregated wages and salaries. The distribution of individual wages and salaries by household income groups was found by summing the totals in the special tabulations of Statistics Canada regardless of industries. Wages and

salaries, considered as inputs across industries in the U and F matrices, are received as outputs by households in the V matrix.

The total value of the census estimates for wages and salaries used to build Model 2 differed by 3 percent from the I-O values. Values differed between the sources on an industry basis. Differences between the 1986 Census and IEA figures on wages and salaries are largely due to definitions, concepts, sources and methods.

The IEA Division defines wages and salaries as follow:

> "comprising all earnings from employment of Canadian residents paid for work performed, whether in cash or in kind, and before deductions for income taxes, unemployment insurance, pensions and other social insurance schemes. Wages and salaries also include military pay allowances, commissions, tips and bonuses, director's fees and taxable allowances, such as cost-of-living allowances and allowances in respect of holidays and sick leave." (Statistics Canada, 1990b:38).

The definition of wages and salaries given in the 1986 Census Dictionary is comparable to that of the IEA. Differences are small as the value of taxable allowances and work-related benefits are excluded, e.g., free automobile use, free lodging, etc. Wages and salaries in the 1986 Census:

> "Refer to gross wages and salaries before deductions for such items as income tax, pensions, unemployment insurance, etc. Included in this source are military pay and allowances, tips, commissions, cash bonuses as well as all type of casual earnings in calendar year 1985." (Statistics Canada, 1987a:32).

To generate data on wages and salaries, the IEA uses employers' tax returns to Revenue Canada (T-4 Supplementary File). To allocate wages and salaries figures by industry, several sources were consulted, such as, the Survey of Employment, Payrolls and Hours, financial reports, industry surveys

and public accounts (see the full list of primary and secondary sources used to generate wages and salaries in the IEA user's guide (Statistics Canada, 1990b:123-4, Appendix I)).

The 1986 Census data were generated by asking individuals in the population the amount of wages and salaries they received during the 1985 calendar year. The Census of Agriculture asked farm operators to report the amounts of wages and salaries paid during 1985. Because of the inability of some individual workers to report the industry code identified from the employers' 'T-4 Supplementary', mis-coding might have occured. This can be important for closely related industries. This problem is recognized and discussed throughout the *User's Guide to 1986 Census Data on Industry* (Statistics Canada, 1990c).

Another source of difference resides in the identification of marginal workers. The census may not provide an estimate of the number of marginal or seasonal workers as precise as the monthly estimates of the Labour Force Survey, also used by the IEA Division.

(B) Net Income of Unincorporated Businesses (NIUB) (commodity #177)

The difficulties associated with the availability of data to disaggregate NIUB by income groups, by industry, and by total household income were identical to those for wages and salaries. A special tabulation (Statistics Canada, 1991b) showing data of self-employment income was used. Levels

of self-employment income (Self-employment in the Census is analogous to NIUB, excluding rents) by farm types were available through the Agricultural Census data base (Statistics Canada, 1992b). The format of these tables was such that the information can be organized to amend and extend both the U and the V matrices. Table A4-6, Appendix H, reports individual NIUB by industry in the U matrix.

The difference between the total value in Census' self-employment income and NIUB (excluding rent) in IEA estimates is 4 percent. Again, definitions, concepts, and methods differ between IEA and Census estimates. These aspects are important when assessing the general quality of the data because estimates on an industry basis between the IEA and NIUB often differ. These differences are much larger than the ones of wages and salaries. [See Cloutier (1992b) for more details on an industry basis.]

Wages and salaries are the major source of income for the household sector. In the Census questionnaire, respondents report the industry of their major income source. This is important for the classification of SLI by industry. For example, one who reports their major income source from wages and salaries in the brewery industries can also be self-employed in a restaurant. Self-employment would thus be coded in the brewing industries, creating a miscoding of self-employment income. More details on the questionnaire can be found in the *Census Handbook* (Statistics Canada, 1988a).

NIUB, as used in the I-O accounting framework, includes both net income of non-farm unincorporated business (including rents) and accrued net income of farm operators from farm production. However, in the IEA, estimated values on these items are reported separately. The 1986 Census also reports these values separately. NIUB is defined in the IEA as:

> "Accrued net income of farm operators from farm production, comprising gross proceeds from the sale of farm products, plus the imputed value of farm output consumed by farmers and their families, plus the value of physical change in farm inventories, less farm operating expenses and capital consumption allowances on farm buildings and equipment. It also includes the accrued earnings (both distributed and undistributed) of farm operators arising out of the operations of the Canadian Wheat Board." (Statistics Canada 1990b:38).

The 1986 Census definition of net farm self-employment income approximates the definition of NIUB in the IEA. A minor difference between the two is the exclusion of farm products consumed on the farm from the IEA. Net farm self-employment income in the Census:

> "Refers to net income (gross receipts from farm sales minus depreciation and cost of operation) received during calendar year 1985 from the operation of a farm, either on own account or in partnership. In the case of partnerships, only the respondent's share of income was to be reported. Also included are the advance, supplementary or assistance payments to farmers by federal or provincial governments. However, the value of income "in kind", such as agricultural products produced and consumed on the farm is excluded " (Statistics Canada 1987a:27).

The IEA Division defines the non-farm component of NIUB as follows:

> "Net income of non-farm unincorporated business, including rent, comprising the earnings of unincorporated proprietors from their own businesses, except farming. The net income of independent professional practitioners such as doctors, dentists, lawyers and engineers is included, as is the net rental income of persons (but not corporations) covering paid and imputed rents, after expenses, from the ownership of residential property and net paid rents from the ownership of non-residential property." (Statistics Canada 1990b.38).

The definition of non-farm self-employment in the 1986 Census differs from the one used by the IEA. In the IEA, rent values are imputed to owner occupied

dwellings, a dummy industry. The absence of owner occupied dwellings in the Census does not influence the allocation of Census users' specified industries to I-O industries. The owner occupied dwelling rents are specified as a separate 'dummy' industry in the I-O framework. The figures are comparible once the rents are subtracted from the NIUB estimates of the IEA. Net income of non-farm unincorporated businesses, including rents:

> "Refers to net income (gross receipts minus expenses of operation such as wages, rents, depreciation, etc.) received during calendar year 1985 from the respondent's non-farm unincorporated business or professional practice. In the case of a partnership, only the respondent's share was to be reported. Also included is the net income from persons babysitting in their own homes, operators of direct distributorships such as selling and delivering cosmetics, as well as free-lance activities of artists, writers, music teachers, hairdressers, dressmakers, etc " (Statistics Canada, 1987a:28).

In Model 2, owner occupied dwelling rents by household income groups were allocated using a proxy. Rent of owner occupied dwellings is a dummy industry reporting the value of individuals renting their own houses to themselves. The distribution of NIUB, by income groups, in this 'industry' was determined using the distribution by income groups of property taxes reported in the FAMEX survey (commodity #2071).

Values of NIUB in the IEA were estimated using several sources. The IEA uses Revenue Canada's Taxation Statistics with other financial and statistical reports (see the Guide to IEA, Statistics Canada, 1990b:127, Appendix I). The Census of Agriculture estimates of self-employment income were obtained by asking agricultural producers their self-employment income.

NIUB in the V matrix was disaggregated using the distribution of self-employment income. The distribution of households' outputs to the I-O control totals as households' outputs is given in Table A4-7, Appendix H.

(C) Supplementary Labour Income (SLI) (commodity #176)

Supplementary labour income (SLI) is defined in the IEA as:

> "Mandatory and non-mandatory employer contributions on behalf of employees for pension funds, social insurance and similar benefits." (Statistics Canada 1990b:38).

Information on SLI is available from producing units. This information is not collected in the Census of Population. A special tabulation from the Labour Income Section of the Labour Division for the year 1986 was used (Statistics Canada, 1990d).

SLI data in the special tabulation were grouped into five main items: (1) Private pension plans (#176A), (2) unemployment insurance (#176B), (3) Canada/ Québec pension plans (#176C), (4) Workers' compensation board (#176D) and (5) Health and welfare plans (#176D). The special tabulation allocates these items to 17 industry groups. These groups were used to allocate the SLI to the 69 I-O industrial sectors.

Table A4-8, Appendix H, shows the SLI on an industry basis. In the personal expenditure section, SLI was itemized using the distribution given in the table quoted above for households. This distribution was used to prorate the I-O control total. The distribution of SLI items by family income groups were given in the FAMEX survey. FAMEX commodities used to alocate I-O SLI

items are: Pensions with #3714-1716; Unemployment insurance with #3715; Canada/Québec Pension plans with #3714; Workers' Compensation Board with #3710; Welfare Plans with #3710). Contributions to SLI in the personal expenditure sector assumed the same prorated distribution by income groups as the one in household's output in the V matrix.

For the V matrix, SLI was distributed as in personal expenditure in the U matrix. It was assumed that households' contribution to SLI by income group reflects the employers' contribution (note that wages and salaries include employees' contributions to SLI items). The SLI component was disaggregated in the V matrix using the same method as wages and salaries, namely by using the control totals in the U and F matrices. Results are listed in Table A4-9, Appendix H.

(D) Investment Income (commodity #178B)

The investment income in the personal expenditure section of the U matrix was disaggregated with information from the Census of Population (Statistics Canada, 1989d, Table 7-1). The Census of Population defines investment income as:

> "Dividends and interest on bonds, deposits and savings certificates, and other investment income, e.g. net rents from real estate, interest from mortgages." (Statistics Canada, 1987a:48)

Investment income as used by the IEA Division is similar to the Census definition:

> "Earnings in the form of interest and dividends accruing to persons from corporations, governments and non-residents. Also includes the interest accruing on private pension funds, life insurance funds and funds invested by other "associations of individuals"." (Statistics Canada, 1990b:138, Appendix II).

Investment income in the personal expenditure category of the U and V matrices was disaggregated by households' income groups using the Census distribution. It was assumed that the prorated distribution paid by personal expenditure categories to individuals, in the U matrix, was equivalent to the distribution for those received as household's outputs in the V matrix. Table A4-10, Appendix H, details, on an industry basis, the value of investment income in the U matrix. Results of the investment income allocation by household income group in the V matrix are presented in Table A4-11, Appendix H.

(E) Government transfers (commodity #180)

The values given in Table A4-11 are government transfers from various government programs. These programs are reported in the IEA tables (Statistics Canada, 1990a, Table 54-55). The composition of government transfers items included in the V matrix are listed in Table 4-2. Government transfers were disaggregated by income group using the closest corresponding items in the Census table (Statistics Canada, 1989d, Table 7-1). Table A4-12 summarizes the allocation of government programs to households by income groups.

Table 4-2 Itemized government transfers

I-O Number and Commodity Title	Census Source
Transfers (Canada/Québec Pension Funds)	Old Age Pension
Transfers (Federal Government - Unemployment Insurance)	Unemployment Insurance
Transfers (Federal Government - Family & Youth Allowances)	Family Allowances
Transfers (Federal Government - Old Age Security)	Retirement Pensions
Transfers (Federal Government - Grants to Native People)	Other Government Income
Transfers (Federal Government - Miscellaneous)	Retirement Pensions
Transfers (Provincial Government - Social Assistance)	Other Government Income
Transfers (Provincial Government - Workers' Compensation Board)	Other Government Income
Transfers (Provincial Government - Mother and Old Age Pension)	Old Age and Family Allowances
Transfers (Provincial Government - Miscellaneous)	Other Government Income
Transfers (Local Government)	Other Government Income

(F) Net Savings (commodity #179)

As discussed in Chapter 3, net savings is a primary input in the U matrix. It represents the difference between total personal expenditure in the U matrix and households' outputs in the V matrix. The value of net savings is determined as a residual between the U and the V matrix for different household income groups.

Summing across commodities in the household sector of the V matrix gives the total value of household output by income group (g). Summing down the columns of the household sectors in the U matrix provides an estimate of the expenditures made by the household sectors (g'). Subtracting the value obtained in the U matrix from the value in the V matrix determines net savings by household income groups. Net savings are reported in Table 4-3.

Table 4-3 Net Savings distributed by Household income groups

NET SAVINGS	MAKE	USE	NET SAVINGS
(< $10,000)	$10,096,450	$14,694,892	($4,598,442)
($10,000 - $14,999)	$14,468,211	$18,000,418	($3,532,207)
($15,000 - $19,999)	$20,092,629	$20,901,536	($808,907)
($20,000 - $24,999)	$24,141,407	$18,130,942	$6,010,465
($25,000 - $29,999)	$28,671,897	$25,828,089	$2,843,808
($30,000 - $34,999)	$32,831,296	$26,064,064	$6,767,232
($35,000 - $39,999)	$33,888,926	$25,586,245	$8,302,681
($40,000 - $44,999)	$34,268,165	$25,598,538	$8,669,627
($45,000 - $49,999)	$31,452,557	$21,727,641	$9,724,916
($50,000 - $59,999)	$53,329,272	$36,305,827	$17,023,445
(> $59,999)	$141,395,900	$63,971,524	$77,424,376
TOTAL	$1,207,872,842	$1,080,045,845	$127,826,997

4.3 Summary and Conclusion

This chapter was concerned with the development of the household sector. Whenever possible, assumptions used in the disaggregation are outlined. Attention was given to definitions, concepts and methods embodied in the data sources used. The information was compared and assessed for compatibility with the IEA.

Chapter 5

EMPIRICAL EVIDENCE AND DISCUSSION

5.1 Introduction and Overview

This Chapter reports the results of an inquiry into the behaviour of both Model 1 and Model 2. In Section 5.2, a comparison is made of the models by analyzing an exogenous increase in individual wages and salaries for different income groups. The economic impacts of changes in final demand for agricultural, agri-food and petrochemical products are reported in Section 5-3. A discussion of the results follows in Section 5-4.

5.2 Impacts of an Increase in Wages and Salaries

The specification of a single vector of personal expenditure in Model 1 implies that the economic impacts on the economy of lower income groups are the same as higher income groups. As hypothesized in Section 3.5, Model 2 is expected to be more sensitive to distributional effects than Model 1 due to the presence of marginal income groups. A disaggregated model should allow for forecasts more in accordance with economic behaviour.

Table 5-1 provides the distribution of personal expenditures by income groups on selected items. Members of lower income groups tend to spend a larger share of their revenue on goods and services produced domestically. For example, raw agricultural and food products accounts for 19.1 percent of the lowest income group expenditure. The lowest income group spends only 0.7 percent on automobiles and 1.3 percent on electric household appliances. By

Table 5-1 Distribution of Households' Expenditure on Selected Composites of Goods and Services, by Household Income Category

Selected Items	< $10,000	$10,000-14,999	$15,000-19,999	$20,000-24,999	$25,000-29,999	$30,000-34,999	$35,000-39,999	$40,000-44,999	$45,000-49,999	$50,000-59,999	> $59,999
	Percentages in Columns										
RAW AGR PRODUCTS	1.9	1.8	1.5	0.6	1.4	1.4	1.3	1.4	1.2	1.2	1.2
AGRI-FOOD PRODUCTS	14.3	13.7	12.2	3.6	11.6	11.7	10.5	10.8	8.9	8.6	7.1
ALCOHOLIC BEVERAGES	1.4	1.9	2.0	2.7	2.3	2.2	2.6	2.3	2.6	2.8	2.5
TOBACCO PRODUCTS	1.5	1.7	1.9	1.9	1.7	1.6	1 8	1.4	1.3	1.4	1.0
PETROCHEMICAL	3.2	4.8	4.9	5.7	5.0	5.3	5.3	5.2	5.5	5 7	5.1
ELECTRONIC & HOUSEH	1.3	1.8	2 3	2.8	2.6	2.6	2.5	2.9	2.5	2.7	2.7
AUTOMOBILES	0.7	2.0	4.2	4.0	4.2	4.8	4.6	4.6	5.5	5.7	6.9
CLOTHING	2.1	2.6	3.1	4.1	3.8	3.9	4 3	4.5	4.9	5.3	6.4
FINANCE, REAL ESTAT	3 8	5 7	6.6	8.2	8.6	9.7	10.7	12.1	12.6	12.7	13.4
AMUSEMENT	8.4	8.9	9.4	8.0	11 0	11.7	11 6	12.2	12.8	12 9	15.3
RENTS	30 6	26.7	21.5	21.9	16 6	13.3	11.4	8.8	6.8	7.6	4.2
OTHER	30 8	28.4	30.4	36.5	31.2	31.8	33.4	33.8	35.4	33.4	34.2

Source Statistics Canada (1988b)

contrast, higher income groups allocate a larger share of their budget to the purchase of automobiles 6.9 percent, electric household appliances 2.7 percent and petrochemical products 5.1 percent. As seen in Table 5-2, automobiles and electrical household appliances are major imports in the Canadian economy. An increase in exogenous wages and salaries is expected to generate lower impacts on GDP and employment if received by higher income groups.

Sensitivity checks were performed by shocking the model with exogenous wages and salaries. This source of revenue was chosen since it accounts for 58 percent of total household income in the Canadian Income and Expenditure Accounts (IEA). Both models were shocked with $1 million. Model 2 was shocked twice, first on the lowest wages and salaries group (less than $10,000) and, then, the highest group (more than $59,999).

The total direct, indirect and induced effects on the Canadian economy are reported in Table 5-3. The economic indicator is industrial output. The effects on industrial output using Model 1 are reported in column 1. A $1 million increase in wages and salaries generates an extra $2.674 million of industrial output in the economy. The economic activity in the household accounts is $1.47 million, or 55 percent of total industrial output. Agriculture and agri-food industries jointly receive 5.9 percent of the total, or $157,296.

In Model 2, exogenous changes in wages and salaries show more detailed results. For instance, total industrial output increased by $3.206 million of direct, indirect and induced effects when the lowest group was

TABLE 5-2 Personal Expenditure, Imports and Total Final Demand for Selected Goods, in 1986 ($M)

	Personal Expenditure	Imports	Total Final Demand
RAW AGR PRODUCTS	2,903	(2,009)	5,983
AGRI-FOOD PRODUCTS	22,014	(3,812)	22,500
ALCOHOLIC BEVERAGES	3,045	(713)	3,010
TOBACCO PROD	1,303	(45)	1,411
PETRO-CHEMICAL PROD	9,031	(9,365)	8,458
ELECTRIC AND HOUSEHO	4,982	(9,715)	4,087
AUTOMOBILES AND TRS	12,725	(38,488)	22,259
CLOTHING	7,465	(2,590)	5,398
FINANCE & BUSINESS SER	30,985	(3,854)	3,491

Note: Values are in purchasers' prices. Parentheses indicate a negative number.

Source: Statistics Canada (1988b)

Table 5-3 **Effects of a $1 M Increase in Exogenous Wages and Salaries Direct, Indirect and Induced Effects on Industrial Output ($)**

Selected Sectors	(1) Model 1	(2) Model 2 Low Income	(3) Model 2 High Income	(2 - 1)/(1) % Diff.	(3-1)/(1) % Diff.
Agriculture	45,467	59,921	27,522	31.8	(39.5)
Agri-food	111,82	147,574	65,629	32.0	(41.6)
Households:	1,469,798	1,651,693	1,348,481	14.4	(8.3)
Less than $10,000		96,102	3,497		
$10,000 - 14,999		104,455	8,470		
$15,000 - 19,999		123,131	14,256		
$20,000 - 24,999		129,836	18,958		
$25,000 - 29,999		135,360	23,139		
$30,000 - 34,999		138,645	26,559		
$35,000 - 39,999		134,672	27,378		
$40,000 - 44,999		124,648	27,920		
$45,000 - 49,999		110,292	25,912		
$50,000 - 59,999		173,454	46,140		
More than $60,000		410,597	1,126,253		
Total Economy	2,674,280	3,206,425	2,165,025	19.9	(19.0)

Note: Parentheses indicate a negative number

targeted (column 2,Table 5-3). The resulting increase was $2.165 million of direct, indirect and induced effects when a similar exogenous change was simulated with the highest wages and salaries group (column 3, Table 5-3). As expected, larger impacts were observed when the lowest household income group was shocked.

The difference between Model 1 and Model 2 on industrial output when the lowest wages and salaries group was stimulated was 19.9 percent. In the household sector, the difference was 14.4 percent. Here, Model 1 underestimated the economic impacts of the lowest wages and salaries group. Similar differences, but in the opposite direction, are noted when the highest wages and salaries group was shocked. Overall, Model 2's approximations were 19.0 percent lower than those obtained with Model 1. The differences are 8.3 percent lower with Model 2 in the household sector. These results showed that Model 1 overestimated the economic contribution of high wages and salaries groups.

The relative distribution of the direct, indirect and induced effects on output among household income groups is also important. A $1 million increase in exogenous wages and salaries to the lowest wages and salaries group generates larger absolute impacts in the higher household income groups The same $1 million given to the highest wages and salaries group creates even larger absolute impacts in the highest household income group and very little in lower household income groups. For example, a $1 million increase in the

lowest wages and salaries group generates $96,102 in the lowest household income group while creating $410,598 in the highest income group. This is due to the fact that many low income group individuals are part of dual income economic-families which have total household income greater than $59,999. However, the same $1 million received by the highest wages and salary group would generate $1,126,254 of industrial output in the highest household income group and only $3,497 in the lowest household group. Most of these impacts are composed of direct and induced effects.

While being important, these results do not indicate the share of direct effects on output for each of the household income groups out of the direct, indirect and induced effects. Table 5-4 shows the percentage distribution of the direct effects on output by household income groups. This table was constructed by successively stimulating each wages and salaries group. The direct impact matrix (D matrix) was multiplied by successive changes in exogenous wages and salaries. For example, shocking the $35,000 - 39,999 wages and salaries group would generate 24.2 percent of the direct effects in the $35,000 - 39,999 household income group. Most of the remaining direct effects are created in high income groups. Similarly, when the $20,000 - 24,999 wages and salaries group is stimulated, 17.6 percent of the direct effect goes to this household income group and 10.7 percent of the direct effect goes to the $40,000 - 44,999 household income group. In Table 5-4 it would not be unusual to observe values reflecting direct effects of wages and

Table 5-4 Direct Effects of $ 1M Increase in Wages and Salaries by Income Groups

	Household Income Groups											
Wages and Salaries	< $10,000	$10,000-14,999	$15,000-19,999	$20,000-24,999	$25,000-29,999	$30,000-34,999	$35,000-39,999	$40,000-44,999	$45,000-49,999	$50,000-59,999	$59,999 <	Total (%)
< $10,000	9.1	8.8	9.6	9.5	9.3	8.9	8.3	7.2	6.1	8.8	14.3	100
$10,000 - 14,999	0.2	10.7	9.6	10.2	10.6	10.2	9.3	8.3	6.9	9.8	14.1	100
$15,000 - 19,999	0.1	0.1	14.1	10.2	9.6	10.6	10.9	9.3	8.0	11 4	15.6	100
$20,000 - 24,999	0.1	0 0	0 1	17.6	11.7	9.8	10.1	10.7	9.0	13.2	17.6	100
$25,000 - 29,999	0.0	0.0	0.1	0.2	20.1	13.4	10.3	10 2	9.5	15.9	20.3	100
$30,000 - 34,999	0.0	0 0	0.0	0 1	0.2	23 2	13.7	10.3	9.8	17.1	25.6	100
$35,000 - 39,999	0.0	0 0	0.0	0.0	0.1	0.3	24.2	14 5	10.5	18.7	31.6	100
$40,000 - 44,999	0.0	0.0	0.0	0 0	0.1	0.1	0 3	25 5	14 6	19 5	39 8	100
$45,000 - 49,999	0.0	0.0	0 0	0 0	0 0	0.1	0 1	0 4	24 6	25.0	49 8	100
$50,000 - 59,999	0.0	0 0	0.0	0 0	0.0	0.0	0.1	0.1	0 3	34 56	64.8	100
> $59,999	0.1	0 0	0.0	0.0	0 0	0.0	0 0	0.0	0.1	0.3	99 5	100

salaries group more than $59,999 in the household income group less than $10,000. An individual may receive $59,999 in wages and salaries while belonging to a household in which other members are losing money in NIUB. Reading from the less than $10,000 wages and salaries group, 9.1 percent of direct effect would go to the lowest household income group. The table indicates that very little indirect and induced effects were created in the lowest household income (see with Table 5-3). The direct effects were equal to $91,000 while the total of direct, indirect and induced effects amounted to $96,102 (see Table 5-3). The lowest wages and salaries group provides the most evenly distributed direct effects across household income groups (Table 5-4). The distribution of direct effects was more interesting to study when higher wages and salaries groups were targeted. It should be noted that no matter which wages and salaries category was stimulated the greatest direct effect always occurred in the greater than $59,999 income group. Excluding the largest income group, diagonal values in Table 5-4 are larger than off-diagonal values for all wages and salaries groups except less and $10,000 and $45,000 - 49,999.

Differences in the behaviour of the models occur outside the household sector. The requirements to satisfy an increase in exogenous wages and salaries were given in Table 5-3. Using Model 1, the direct, indirect and induced effects in agriculture were $45,467 worth of industrial output. With Model 2, an increase in the lowest wages and salaries group generated

$59,921 worth of industrial output in agriculture while, in the highest income group it generated $27,522. Stimulating the lowest wages and salaries group contributed more than twice the industrial output of the agricultural sectors when compared to the high income group. A similar phenomenon was observed in the agri-food industries, where an increase in the lowest wages and salaries group resulted in a $147,574 increase, about 32 percent larger than Model 1. The impact on this sector when the highest wages and salaries group was stimulated was only $65,629, a decline of 41.6 percent relative to Model 1.

These results were consistent with the hypotheses stated in Section 3.6. Model 1 overestimated the impacts of a $1 million increase in wages and salaries to high income groups and underestimated those of a stimulus to the lower income groups. A similar result was also observed for the agriculture sector and the agri-food industries. There are two major reasons for these results. First, as seen in Table 5-1, high income households were more likely to spend a larger share of a $1 million increase in wages and salaries for the purchase of imported goods than lower income groups. This behaviour results in a leakage from the economy because there are no backward linkages associated with the purchases of imported goods. The relatively high impact of lower income groups can, in part, be explained by the fact that expenditures by these groups include a larger share of domestically produced goods, contributing backward linkages. Second, lower income groups have a negative

saving rate (see Table 4-3). This implies that lower income households spend more than their disposable income.

The above simulation compared the behaviour of Model 2 relative to Model 1. Large differences were observed between output indicators of Model 1 and Model 2, especially when the lowest and highest income groups alternatively receive the exogenous increase in wages and salaries. This result is consistent with the conclusions reached by Bernat and Johnson (1985b).

5.3 Changes in Final Demand: Impacts on the Agricultural, Agri-food and Petrochemical Industries

Agricultural economists are interested in comparing the economic impacts of spending a fixed amount of money on either manufactured agricultural products or raw agricultural commodities. The economic indicators of interest are industrial output, GDP at factor cost and the number of paid jobs. The analysis can also include a comparison between agri-food industries and another manufacturing sector such as petrochemicals.

In Table 5-5, the distribution of the two most important sources of household income, wages and salaries and NIUB, is given for the three selected industries. Wages and salaries represent 8.2 percent of total expenses in agriculture. In the agri-food sector, they amount to 14.6 percent and, in petrochemicals, they are 10.2 percent. Agriculture has a larger share of household income from NIUB, 17.5 percent, while the agri-food and

petrochemical industries pay only a negligible share (0.02 percent). Approximately 40 percent of the wages and salaries paid in agriculture are received by individuals earning less than $24,999 a year. In the agri-food industries, 46 percent of the wages and salaries are received by individuals earning more than $20,000 and less than $35,000. The bulk of wages and salaries paid in the petrochemical industries, approximately 46 5 percent, goes to individuals earning more than $25,000 and less than $45,000 a year In general, agriculture contributes more wages and salaries to lower income groups in comparison with the other two manufacturing sectors.

The influence of a disaggregated household sector was studied by assuming a stimulus of $1 million to the final demand for industry output. By varying the stimulus across different industrial sectors (agriculture, agri food and petrochemicals), the analysts would estimate what generates the largest impact on the economy.

Three final demand vectors were constructed using the total value of final demand for agricultural, agri-food and petrochemical products from the I O final demand matrix. Each vector was converted from producers' prices to purchasers' prices before the $1 million was prorated. To maintain consistency with producers' prices within the I-O model, margins and taxes were reallocated to their proper commodity. The values for the commodities stimulated are given, in Appendix I, in both purchasers' and producers' prices (Table A5-1,2 and 3).

Table 5-5 Distribution of Wages and Salaries and of NIUB in Selected Industries

	(%) Distribution of Wages and Salaries				(%) Distribution of NIUB			
	Agriculture	Agri-food	Petro-Chemicals	Total	Agriculture	Agri-food	Petro-Chemicals	Total
< $10,000	18 5	7.2	2 5	8.1	-4.3	-7.0	-30.7	2.8
$10,000 - 14,999	8 7	7.2	3.6	8 1	12 8	17.6	12.1	7.8
$15,000 - 19,999	6 9	11 0	7 0	11.3	10.5	18.0	17.6	7.9
$20,000 - 24,999	6.1	15.1	9 9	12 8	12 0	17.2	8.5	7.8
$25,000 - 29,999	4.4	16.4	11.5	12.6	8.8	12.3	12.7	7.0
$30,000 - 34,999	4.8	14.6	12.3	12.2	7.9	8.5	13.0	6.8
$35,000 - 39,999	3.0	9.3	12.0	9.5	5.9	5.4	13.1	5.6
$40,000 - 44,999	3.7	6.2	11.9	7.6	5.7	3.7	10 0	5.7
$45,000 - 49,999	2.2	3 2	7 5	4.5	4.1	1.0	0 0	4.5
$50,000 - 59,999	11.2	3 7	9.1	5.2	7.9	4.9	17.6	8.6
> $59,999	30.5	6.2	12.7	8.1	28.7	18.4	26.0	35.5
Total ($)	1,939,115	6,170,327	3,547,500	24,791,072	4,128,943	8,215	7,023	33,048,543
% of Total Input	8.2	14.6	10.2	31.0	17.5	0.02	0 02	4.6

When $1 million was spent on the agri-food or the petrochemical bundle, part of the amount goes into indirect taxes, a commodity exogenous to the model. Indirect taxes amount to $131,294 for agri-food products and $174,303 for petrochemical products (see Table A5-2 and A5 3, Appendix I). There were no indirect taxes on agricultural items The allocation of these values results in a leakage out of the model. Total margins in agriculture account for 27 percent of the increase in final demand. In the agri-food bundle, margins amount to 22 percent, while margins account for 25 percent of the petrochemical products. Direct requirements needed to satisfy the increase in final demand excludes indirect taxes as they are exogenous to the model.

Results which compare the performance of Model 1 with Model 2 are reported in Table 5-6, Section I, II and III. Each section in the table presents the direct, indirect and induced effects on output and GDP at factor cost of an increase in final demand for agriculture, agri-food and petrochemical products. Overall, there seems to be no major difference between the values of output and GDP from Model 1 and Model 2. In most sectors, the differences are minor. Model 2 provides constantly higher values, implying greater interdependence with the rest of the economy, for the three cases.

Larger differences can be found in the household sector. An increase in final demand results in differences of 11.5 percent in agriculture, 13.6 percent in the agri-food and 25.7 in the petrochemical sectors for the household sector

Table 5-6 Direct, Indirect and Induced Effects of an Increase of $1M in Final Demand

I. Direct, Indirect and Induced Effects of $1M Increase in Final Demand for Agricultural Products (in dollars)

Selected Sector	Industrial Output		G.D.P at Factor Cost	
	Model 1	Model 2	Model 1	Model 2
Agriculture	1,006,452	1,007,088	482,609	482,907
Food	143,985	145,293	37,327	37,718
Petrochemical	150,801	152,393	34,398	34,698
Households	931,332	1,038,946	25,872	24,738
Total Economy	3,667,083	3,811,096	1,330,089	1,346,656

II. Direct, Indirect and Induced Effects of $1M Increase in Final Demand for Agri-food Products (in Dollars)

Selected Sector	Industrial Output		G.D.P. at Factor Cost	
	Model 1	Model 2	Model 1	Model 2
Agriculture	269,222	270,687	125,019	125,709
Agri-food	825,725	829,290	250,015	251,093
Petrochemical	61,366	63,581	13,632	14,064
Household	731,398	830,975	20,318	20,398
Total Economy	3,084,658	3,236,265	1,047,441	1,074,044

Table 5-6 (Continued)

III. Effects of $1M Increase in Final Demand for Petro-chemical Products

Selected Sector	Industrial Output		G.D.P. at Factor Cost	
	Model 1	Model 2	Model 1	Model 2
Agriculture	21,922	24,597	10,255	11,518
Agri-food	57,081	63,583	17,693	19,647
Petrochemical	641,960	645,298	122,783	123,448
Household	527,001	662,572	14,640	15,862
Total Economy	2,497,372	2,715,893	844,512	858,983

between Model 1 and Model 2. Higher wages and salaries and NIUB groups receive more revenue due to increased industrial activity in these sectors. Hence, the distribution of revenue sources by households' income group reflects the situation described in Table 5-5. Petrochemical industries have a larger share of high wages and salaries, and this is reflected in the differences between Model 1 and Model 2 in the household sector. Differences are less acute in the agri-food industries and in agriculture. The explicit presence of a disaggregated household sector may have affected the estimated magnitude of the impact on industrial output and GDP at factor cost estimates. However, the impacts on households due to the increase in final demand were smaller for petrochemicals than for agriculture and for agri-food industries.

The decomposition of direct, indirect and induced effects show the economic importance of each industry (see Table 5-7). Using Model 2, the economic impact of an autonomous increase of $1 million was the largest in agriculture, followed by the agri-food industries. The total effects for industrial output were $3.8 million for agricultural products, $3.2 million with the agri-food bundle and only $2.7 million with the petrochemical products. Similarly, the total effects on GDP at factor cost were largest when the agriculture sector was stimulated, $1.3 million, followed by the agri-food industries, $1.1 million. Total effects on GDP at factor cost when the petrochemical industries were shocked, accounted for about $.86 million.

Induced effects accounted for 48.2, 45.8 and 43.4 percent of the total

Table 5-7 Effects of $1M Increase in Final Demand for Selected Industries

I. Effects of $1 M Increase in Final Demand for Agricultural Commodities (in Dollars)

Effect	Industrial Output		G.D.P. at Factor Cost		Employment (Number of Jobs)	
	Agriculture	Total	Agriculture	Total	Agriculture	Total
Direct	783,256	1,000,000	383,184	481,484	6.3	9.1
Direct, Indirect	977,657	1,972,583	469,123	895,283	7.5	16.7
Direct, Indirect, Induced	1,007,088	3,811,096	482,907	1,346,656	7.9	29.1

II. Effects of $1M Increase in Final Demand for Agri-food Products

Effect	Industrial Output		G.D.P. at Factor Cost		Employment (Number of Jobs)	
	Agri-food	Total	Agri-food	Total	Agri-food	Total
Direct	638,147	868,706	200,494	340,330	3.5	8.9
Direct, Indirect	770,064	1,753,894	233,333	705,871	4.0	15.5
Direct, Indirect, Induced	829,290	3,236,265	125,709	1,094,442	4 3	25.5

Table 5-7 (Continued)

III. Effects of $1M Increase in Final Demand for Petro-Chemical Products

Effect	Industrial Output		G.D.P. at Factor Cost		Employment (Number of Jobs)	
	Petro-chem.	Total	Petro-chem.	Total	Petro-chem.	Total
Direct	557,826	825,697	103,516	264,274	1.2	6.0
Direct, Indirect	625,650	1,538,529	119,452	598,397	1.4	10.7
Direct, Indirect, Induced	645,298	2,715,893	123,448	858,983	1.4	18.7

change in industrial output for the agriculture bundle, agri-food products and petrochemical bundle, respectively. Induced effects amounted to 33 5 percent of the change in GDP with the agricultural product simulations, 34.3 percent in the agri-food bundle and 30.3 percent in the petrochemical products.

Employment indicators are also important. With a final demand increase of $1 million on the goods produced by these sectors, the largest number of paid jobs was created by agriculture. with 29. Table 5-7 also indicates that 26 paid jobs were created by the agri-food industries, while petrochemical industries created approximately 19 jobs. Agriculture created 10 more jobs than the petrochemical simulation.

Results obtained by this simulation indicated that Model 1 had lower estimated impacts than Model 2. Nonetheless, total results do not significantly differ. The major advantage of Model 2 over Model 1 resides in its ability to supply answers related to the distribution of industrial output, GDP at factor cost and employment by income category. Comparing Model 1 with Model 2 can allow consideration of effects due to the distribution of wages and salaries and NIUB. One of Model 2's distinct advantages resides in the specification of the disaggregated primary inputs and households' outputs Questions related to the impact of the distribution by income groups cannot be addressed with Model 1.

The impacts of shocking the agriculture sector on the overall economy were larger than those of the two other manufacturing sectors examined

These results are likely due to the relative high industrial output, GDP and employment components of the agricultural sector. Also, the leakages out of the model associated with indirect taxes on products from the manufacturing sectors resulted in lower estimates for agri-food and petrochemical industries.

5.4 Type I and Type II Output Multipliers

Type I and Type II output multipliers were generated by summing the columns in the Leontief inverse [$g = (I-BD)^{-1}$] of the AC open model, Model 1 and Model 2. The multipliers by industry are given in Table A5-1, Appendix J. As expected, Type II multipliers, generated by either Model 1 or Model 2, are always greater than Type I multipliers. This is because Type II multipliers show added interindustry linkages with the household sector.

Type II multipliers generated with either Model 1 or Model 2 do not exhibit constant patterns of differences. Depending upon case, Type II multipliers were relatively lower or higher when estimated with either Model 1 or Model 2. For agricultural sectors, the Type II multipliers of Model 1 were higher than those of Model 2. Agri-food industries generated mixed results.

The multipliers given in Table A5-1 must be use with caution as they are subject to the limitations of the assumptions discussed in Section 3.4.4. It was also emphasized in Section 2.3 that multipliers have both theoretical and empirical shortcomings.

5.5 Discussion and Conclusion

The simulations used to test Model 2 against Model 1 clearly established the feasibility, as well as the usefulness, of building a closed model with a disaggregated household component. One important assumption used in Model 1, namely that households are homogeneous, was tested. The results indicate that Model 2 was more consistent with observed economic phenomena than Model 1. The simulations have also studied the economic contribution of the agriculture sector compared to the agri-food products industries and the petrochemical industries and their impacts on the distribution of income.

Model 2 was more sensitive to changes in exogenous wages and salaries than to changes in final demand. In the first simulation, changes in exogenous wages and salaries show larger differences between the two models. In the second simulation, when changes in final demand were studied, total impacts do not differ considerably. This result was similar to the ones of Bernat and Johnson (1985b).

The disaggregated model provides a means for studying questions related to income distribution. A model with only an average household vector cannot answer questions about the distribution of income across income groups. Model 1 gives the same answer to an increase in any of the household income related components (wages and salaries, NIUB, SLI, investment income and government related transfers) due to the single aggregated expenditure function in the household sector. Model 2 introduces much more flexibility.

A model that assumes homogeneity among households truncates the induced effects. A model closed using a unique vector of household expenditure and revenue underestimates the economic contribution of lower (than average) income groups and overestimates the economic contribution of higher (than average) income groups. These biases associated with the assumption of homogeneity lead to results which must be used with care and professional judgement when interpreting the results from Model 1. With this model, questions related to expenditure patterns or government programs involving money transfers to individuals can offer only limited answers.

These simulated results were a first step towards a wide array of possibilities for further technical explorations of the household sector within the Canadian I-O model. Conclusions were also consistent with a body of economic theory and empirical evidence concerning income distribution and expenditure patterns of households.

Chapter 6

CONCLUSION

6.1 Summary

The objective of the research was to demonstrate the need, feasibility and relevance of disaggregating, by income category, the endogenized household sector in the Canadian I-O model. A disaggregated household sector provides a means of studying impacts on the economy of changes in final demand and adds the possibility of looking at income distribution.

Two models were developed, Model 1 and Model 2. Following Statistics Canada's (1981) instructions, all household revenue sources were endogenized in the Agriculture Canada I-O model. Model 1 used a basic framework that assumes homogeneity among households. In particular, it does not distinguish between households' income levels and will either overestimate or underestimate the results of stimulus depending upon the initial levels and the distribution of income. The economic contribution of households was represented by one vector of personal expenditures and related primary inputs. Model 2 relaxed the homogeneity assumption inherent in Model 1. It disaggregated personal expenditures, wages and salaries, and NIUB by marginal income categories. Other primary inputs were itemized and distributed by household income groups. Another interesting feature of Model 2 was that the disaggregation occurred in a rectangular framework and revenue sources were all included. Studies reviewed in Chapter 2 dealt with square frameworks for which the sources of household revenue were not always complete.

Model 2 was compared with Model 1 for differences in economic impacts. Two simulations were studied. Changes in wages and salaries and changes in final demand were separately considered in these simulations. Large differences were found between the models when wages and salaries were shocked. An increase in the lowest wages and salaries group in Model 2, compared with Model 1, showed that the impacts on industrial output were underestimated in Model 1. By contrast, an increase in the highest wages and salaries group of Model 2, compared with the results from Model 1, indicated that Model 1 overestimated impacts. These results were consistent with the hypotheses stated in Section 3.5 and with previous empirical evidence discussed in Section 2.3. Greater backward linkages were found when the lowest wages and salaries group were shocked. Members of the higher wages and salaries group tend to spend a larger share of the increase on imported goods and saved more, showing less interdependence with the rest of the domestic economy. In comparison, lower household income groups had a negative savings rate.

Changes in final demand were simulated for three sectors: agriculture, agri-food and petrochemical products industries. Overall the results were not significantly different between Model 1 and Model 2. The reason for this was that wages and salaries were only a small fraction of the total inputs used by these industries. The major contribution of Model 2 in this situation was the possibility to address questions related to the distribution of income. A

disaggregated household sector was more flexible and behaved more in accordance with economic theory.

The results indicated that changes in exogenous wages and salaries were more important than changes in final demand when studying the household sector. This result agrees with the simulations of Bernat and Johnson (1985b).

Overall the results were informative and fulfilled the objective of the research. Based on the above results, there are no doubts that a disaggregated household sector introduced greater flexibility in the study of the household sector's contribution to the economy. More questions can now be addressed in a much broader realm than the simple estimation of the induced effect. The relative importance of household income groups can also be studied. Model 2 gives a better perspective on the distribution of income as an emergent property of economic systems based on production and exchange. This would be especially important for analysis when policy questions related to employment, revenue, transfer payments and taxation are important. Model 2 adds more precision and detail to the behaviour of households.

6.2 Limitations of the Research

The results are contingent on the quality of the model. The basic I-O model assumptions are discussed in Section 3.4.3. Among these, I-O models make use of linear production functions. Constant technology and market shares are also assumed in fixed proportions. The I-O model used was also

insensitive to changes in prices. In closing the model with the basic framework, households are assumed to be homogeneous.

Several assumptions are used here to disaggregate the household sector. For instance, personal expenditures were all attributed to households. The personal expenditure category also includes expenditure by universities, labour unions, clubs and nonprofit organizations. There were no means, given the data available, to distinguish these groups from the household sector.

6.3 Recommendations for Further Research

The study has supported the superiority of a disaggregated household sector over one that assumes homogeneity. The technique used to disaggregate the household sector modelled personal expenditures by household income groups. As indicated previously, this specification does not directly estimate the marginal propensity to consume. Another alternative specification of personal expenditures could estimate the marginal propensity to consume by income groups using the Ideal Demand System (Deaton and Muelbauer, 1980) as suggested by Johnson and Capps (1984). Disaggregation of personal expenditures along farm, rural nonfarm and urban lines would also be useful. This is currently being undertaken by the ERS\USDA for the United States (Rose *et al.* 1991), where the household sector is disaggregated by income groups and by rural and urban populations.

For the past three decades, most studies have focussed their attention

on specific technical aspects of modelling the household sector. The accuracy of the induced effect is an important question but it is not strictly contingent on the specification of the household sector. Other macroeconomic variables should be considered for further research development. For example, the position of the model in the economic cycle, technical change, interest rates, exchange rates, inflation, spending and investment policies should also be considered. The behaviour of other economic agents such as the government and capital investors can also be the object of further research. These aspects are also important for improving the accuracy of the estimations of the induced effects.

Literature Cited

Artle, R. (1961), "On Some Methods and Problems in the Study of Metropolitan Economies," (Regional Science Association Papers, VIII, Hague Congress).

Asimakopulos, A. (1978), *An Introduction to Economic Theory: Microeconomics* (Toronto, On: Oxford University Press).

Asimakopulos, A. (1991), *Keynes's General Theory and Accumulation* (Cambridge, England: Cambridge University Press).

Bernat, G. Andrew Jr. and Thomas G. Johnson (1985a), "An Input-Output Model with Endogenous Unemployment Benefits," Paper Presented at The American Agricultural Economics Association, Ames, Iowa.

Bernat, G. Andrew Jr. and Thomas G. Johnson (1985b), "The Regional Distribution of Income: An Input-Output Approach," Paper Presented at the Annual Meeting of the Southern Regional Science Association, Washington, D.C.

Bernat, G. Andrew Jr. and Thomas G. Johnson (1991), "Distributed Effects of Household Linkage," *American Journal of Agricultural Economics*, **73**:326-33

Blackwell, Jon (1978), "Disaggregation of the Household Sector in Regional Input-Output Analysis: Some Models Specifying Previous Residence of Worker," *Regional Studies*, 12:367-77.

Bródy, A. and A.P. Carter (1972), *Input-Output Techniques, Proceedings of The Fifth International Conference on Input-Output Techniques* (New York, NY: American Elsevier).

Chenery, Hollis B. and Paul G. Clark (1959), *Interindustry Economics* (New York, NY: John Wiley).

Cloutier, L. Martin (1992a), *Notes on Software Use in Input-Ouput Analysis: Gauss versus Shazam* (Montréal, Qc: Department of Agricultural Economics, McGill University).

Cloutier, L. Martin (1992b), *The EIA and Data Sources to Disaggregate the Household Sector, Details of the Differences* (Montréal, Qc: Department of Agricultural Economics, McGill University).

Deaton, A. and J. Muelbauer (1980), "An Almost Ideal Demand System," *American Economic Review*, **70**:312-27.

Dervis, Kemal, J. DeMelo and S. Robinson (1982), *General Equilibrium Models for Development* (New York: Cambridge University Press).

Dorfman, Robert, Paul A. Samuelson and Robert M. Solow (1958), *Linear Programming and Economic Analysis* (New York, NY: McGraw Hill).

Evans, Michael K. (1969), *Macroeconomic Activity, Theory, Forecasting and Control* (New York, NY: Harper and Row)

Gigantes, T. and R. Hoffman (1972), "A Price-Output Nucleus for Simulation Models," in Bródy and Carter (eds.), pp. 319-339.

Gould, Brian W. (1986), The Impacts of Structural Change Within an Economy on Resource Use: An Input-Output Analysis, *Applied Economics*, **18**:1-21.

Hassan, Zuhair A. and Shankar Narayanan (1987), *Economic Modeling in Agriculture Canada: Past and Future* (Ottawa, On: Agriculture Canada, Policy Branch, Working Paper No. 12)

Heady, E.O. and Wilfred Candler (1958), *Linear Programming Methods* (Ames: Iowa State College Press).

Henry, M.S. and T.L. Martin (1984), "Rural Area Consumer Demand and Regional Input-Output Analysis: Reply," *American Journal of Agricultural Economics*, **66**:177-9.

Hudson, E.A. and D. Jorgenson (1974), "U.S. Energy Policy and Economic Growth, 1975-200," *Bell Journal of Economics and Management Science*, **5**:461-514.

Input-Output Division (1991), *Statistics Canada Input-Output Model: General Description, Critical Analysis of Partially Closed Version and Alternative Solutions*. [Unpublised Memorandum].

Johnson, Thomas G., and Surendra N. Kulshreshtha (1981), *Nature of Intersectorial Relations of Saskatchewan Agriculture: An Input-Output Analysis* (Saskatoon, Saskatchewan: Department of Agricultural Economics, University of Saskatchewan).

Johnson, T.G. and O. Capps, Jr. (1984), "Rural Area Consumer Demand and Regional Input-Output Analysis: Comment," *American Journal of Agricultural Economics*, **66**:173-6.

Keynes, John Maynard (1953), *The General Theory of Employment, Interest, and Money* (New York, NY: Harcourt Brace Jovanovich).

Leontief, Wassily (1941), *The Structure of American Economy, 1919 1929* (Cambridge, MA: Harvard University Press).

Leontief, Wassily (1986), *Input-Output Economics*, Second Edition (New York, NY: Oxford University Press).

Madden, Moss and Peter W.J. Batey (1983), "Linked Population and Economic Models: Some Methodological Issues in Forcasting, Analysis, and Policy Optimization," *Journal of Regional Science*, **23**:141-64.

Martin, Thomas L. and M.S. Henry (1982), "Rural Area Consumer Demand and Regional Input-Output Analysis, *American Journal of Agricultural Economics*, *64*:752-755.

Matuszewski, T. (1972), "Partly Disaggregated Rectangular Input-Output Models and Their Use for the Purposes of a Large Corporation," in Bródy and Carter (eds.), pp. 301-118.

Midmore, Peter (ed.) (1991), *Input-Output Models in the Agricultural Sector* (Brookfielf, VT: Avebury).

Miernyk, W.H., E.R. Bonner, J.H. Chapman and K. Shellhanner (1967), *Impact of the Space Program on a Local Economy* (Morgantown, WV: West Virginia University Press).

Miller, R.E. and P. Blair (1985), *Input-Output Analysis: Foundations and Extensions* (Englewood Cliffs, NJ: Prentice Hall).

Miller, Ronald E. Karen R. Polenske, and Adam Z. Rose (1989), *Frontiers of Input-Output Analysis* (New York: Oxford University Press).

Miyazawa, K. (1976), *Input-Output Analysis and the Structure of Income Distribution*, Lecture Notes in Economics and Mathematical Economics Series, (ed.) M. Beckman and H.P. Kunzi (New York: Springer-Verlag).

Pyatt, Graham and Jefery I. Round (eds.) (1985), *Social Accounting Matrices, A Basis for Planning* (Washington, D.C.: World Bank).

Rose, Adam Z. and Paul Beaumont (1989), "Interregional Income Distribution Multipliers for the U.S. Economy," in Ronald E. Miller *et al.* (eds.). pp. 134-47.

Rose, Adam Z. and William Miernyk (1989), "Input-Output Analysis: The First Fifty Years," *Economic Systems Research*, 1:229-71.

Rose, A., B. Eduardo and P.-C. Li (1991), *Disaggregated Household Accounts for the ERS/USDA Social Accounting Matrix Database* (University Park, PA: Department of Mineral Economics, The Pensylvania State University).

Round, J.I. (1989), "Decomposition of Input-Output and Economy Wide Multipliers in a Regional Setting," in Miller *et al.* (eds.), Chapter 8.

Statistics Canada (1981), *User's Guide to Statistics Canada Structural Economics Models*, Structural Analysis Division.

Statistics Canada (1984), *The Input-Output Structure of the Canadian Economy, 1971-77*, Input-Output Division, Cat. 15-201.

Statistics Canada (1986), *Canadian Standard Industrial Classification For Computing and Enterprises, 1980*, Standard Division, Cat. 12-570E.

Statistics Canada (1987a), *Dictionary (Reference)*, Census, Cat. 99-101.

Statistics Canada (1987b), *The Input-Output Structure of the Canadian Economy, 1961-81*, System of National Accounts, Input-Output Division. Cat. 15-501.

Statistics Canada (1988a), *Census Handbook (Reference)*, Census, Cat. 99-104.

Statistics Canada (1988b), *The Input-Output Structure of the Canadian Economy, 1986*, System of National Accounts, Input-Output Division, Cat. 15-201.

Statistics Canada (1989a), *National Income and Expenditure Accounts, Annual Estimates, 1977-1988*, System of National Accounts, Income and Expenditure Division, Cat. 13-201A.

Statistics Canada (1989b), *Family Food Expenditure in Canada, 1986*, Household Surveys Division, Family Expenditure Surveys Section, Cat. 62-554f.

Statistics Canada (1989c), *Family Expenditure in Canada, 1986*, Household Surveys Division, Family Expenditure Surveys Sections, Cat. 62-555f.

Statistics Canada (1989d), *Household Income: Private Households, Population and Dwelling Characteristics*, Table 7-1, Private Households With Income by Selected Characteristics. Cat. 93-119.

Statistics Canada (1990a), *National Income and Expenditure Accounts, Annual Estimates, 1978-1989*, System of National Accounts, Income and Expenditure Division, Cat. 13-201A.

Statistics Canada (1990b), *Guide to the Income and Expenditure Accounts, Income and Expenditure Accounts Sources and Methods Series*, System of National Accounts, Income and Expenditure Accounts Division, Cat. 13-603E, No. 1.

Statistics Canada (1990c), *User's Guide to Census Data on Industry*, Census, Labour and Household Surveys Analysis Division, Cat 99-110E.

Statistics Canada (1990d), *Wages and Salaries and SLI by Industry*, Special Tabulation, Labour Income Section, Labour Division

Statistics Canada (1991a), *Table 1: Population 15 and Over, with 1985 Wages and Salaries, Household Income Size Groups (12) and by User specified Industry Groups (61) (Based on 1980 SIC), Showing Counts and Average 1985 Wages and Salaries, for Canada and Provinces*, Special Tabulation from the 1986 Census of Population.

Statistics Canada (1991b), *Table 2: Population 15 and Over, with 1985 Self employment Income, Household Income Size Groups (12) and by User specified Industry Groups (61) (Based on 1980 SIC), Showing Counts and Average 1985 Self-employment Income, for Canada and Provinces*, Special Tabulation from the 1986 Census of Population.

Statistics Canada (1992a), *Wages Paid by Farm Operations by Type of Farm and Income Classes, Canada, (Sales GE $2500)*, Special Tabulation from the 1986 Census of Agriculture.

Statistics Canada (1992b), *Farm and Self-Employment Income of Farm Families by Type of Farm and Income Classes, Canada, 1986 AG-POP Linkage, (Sales GE $2500)*, Special Tabulation from the 1986 Census of Agriculture.

Stone, Richard (1985), *The Disaggregation of the Household Sector in the National Accounts*, in Pyatt and Round (eds.).

Thomassin, Paul and Allan Andison (1987), *Agriculture Canada's Input-Output Model, Part I: Disaggregation of the Agriculture Sector* (Agriculture Canada, Policy Branch, Ottawa).

Thomassin, Paul J., L.C. Carpentier and L.M. Cloutier (1992a), *Development of a Disaggregated Input-Output Model for Agriculture* (Ste-Anne-de Bellevue, Qc: Department of Agricultural Economics, McGill University).

Thomassin, Paul J., J.C. Henning and L. Baker (1992b), "Macroeconomic Impacts of an Agro-Ethanol Industry in Canada," *Canadian Journal of Agricultural Economics*, (Forthcoming).

Tiebout, C.M. (1969), "An Empirical Input-Output Projection Model: The State of Washington 1980," *Review of Economics and Statistics*, **51**:334-40.

Vaillancourt, F. (1985), "Income Distribution and Economic Security in Canada: An Overview," Chapter 1, pp. 1-75, in Vaillancourt, F. (ed.), *Income Distribution and Economic Security in Canada* (Toronto, On: Toronto University Press).

Weisskoff, Richard and Edward N. Wolff (1981), "The Structure of Income Inequality in Puerto Rico," *Journal of Development Economics*, **9**:206-28.

APPENDIX A

LIST OF INDUSTRIES

INDUSTRY TITLE
DISAGGREGATED FORM
AGGREGATION
AGRICULTURE ( )

1	DAIRY FARMS	1
2	CATTLE FARMS	1
3	HOG FARMS	1
4	POULTRY FARMS	1
5	WHEAT FARMS	1
6	SMALL GRAIN FARMS	1
7	FIELD CROPS FARMS	1
8	FRUIT FARMS	1
9	VEGETABLE FARMS	1
10	MISCELLANEOUS SPECIALITIE FARMS	1
11	LIVESTOCK COMBINATION FARMS	1
12	OTHER COMBINATION FARMS	1
13	FISH & TRAPPING INDUSTRIES	2
14	LOGGING & FORESTRY INDUSTRIES	3
15	MINING	4
16	CRUDE PETROLEUM & NATURAL GAS	5
17	QUARRY & SAND PIT INDUSTRIES	6
18	SERVICE RELATED TO MINERAL EXTRACTION	7
19	MEAT & MEAT PRODUCTS (EXC. POULTRY)	8
20	POULTRY PRODUCTS	8
21	FISH PRODUCTS INDUSTRY	8
22	FRUIT AND VEGETABLE INDUSTRIES	8
23	DAIRY PRODUCTS INDUSTRIES	8
24	FEED INDUSTRY	8
25	VEGETABLE OIL MILLS (EXC. CORN OIL)	8
26	BISCUIT INDUSTRY	8
27	BREAD & OTHER BAKERY PRODUCTS IND.	8
28	CANE & BEET SUGAR INDUSTRY	8
29	MISC FOOD PRODUCTS INDUSTRIES NEC.	8
30	SOFT DRINK INDUSTRY	9
31	DISTILLERY PRODUCTS INDUSTRY	9
32	BREWERY PRODUCTS INDUSTRY	9
33	WINE INDUSTRY	9
34	TOBACCO PRODUCTS INDUSTRIES	10
35	RUBBER PRODUCTS INDUSTRIES	11
36	PLASTIC INDUSTRIES	12
37	LEATHER INDUSTRIES	13
38	TEXTILE INDUSTRIES	14
39	CLOTHING INDUSTRIES	15
40	WOOD INDUSTRIES	16
41	FURNITURE INDUSTRIES	17
42	PAPER INDUSTRIES	18
43	PUBLISHING & PRINTING IND	19
44	PRIMARY STEEL INDUSTRIES	20
45	METAL FABRICATING INDUSTRIES	21
46	MACHINERY INDUSTRIES	22
47	TRANSPORTATION EQUIPMENT IND	23
48	ELECTRICAL PRODUCTS INDUSTRIES	24
49	NON-METALLIC MINERAL PROD IND	25
50	REFINED PETROLEUM & COAL PROD IND	26
51	CHEMICAL PRODUCTS INDUSTRIES	27
52	OTHER MANUFACTURED PROD IND	28
53	CONSTRUCTION INDUSTRIES	29
54	TRANSPORTATION INDUSTRIES	30
55	PIPELINES TRANSPORTATION INDUSTRIES	31
56	STORAGE & WAREHOUSING INDUSTRIES	32
57	COMMUNICATION INDUSTRIES	33
58	OTHER UTILITY INDUSTRIES	34
59	WHOLESALE TRADE INDUSTRIES	35
60	RETAIL TRADE INDUSTRIES	36
61	FINANCE & REAL ESTATE INDUSTRIES	37
62	INSURANCE INDUSTRIES	38
63	GOVERNT ROYALTIES ON NATL RESOURCES	39
64	OWNER OCCUPIED DWELLINGS	40
65	BUSINESS SERVICES	41
66	EDUCATIONAL SERVICE INDUSTRIES	42
67	HEALTH & SOCIAL SERVICES	43
68	ACCOMMODATION SERVICE INDUSTRIES	44
69	AMUSEMENT & RECREATION INDUSTRIES	45
70	PERSONAL SERVICES	46
71	OTHER SERVICES	47
72	SUPPLIES INDUSTRIES	48
73	TRAVEL & PROMOTION INDUSTRIES	49
74	TRANSPORTATION MARGINS	50

APPENDIX B

LIST OF FINAL DEMAND CATEGORIES

No.	Final Demand Categories
1	P.E. MEHICULES, PARTS & REPAIRS
2	P.E. FURNITURE & HOUSEHOLD APPLIANCES
3	P.E. OTHER DURABLE GOODS
4	P.E. CLOTHING & FOOTWEAR
5	P.E. OTHER SEMI-DURABLE GOODS
6	P.E. FOOD & NON-ALCOHOLIC
7	P.E. MOTOR FUELS & LUBRICANTS
8	P.E. ELECTRICITY, GAS & OTHER FUELS
9	P.E. OTHER NON-DURABLE GOODS
10	P E. GROSS RENT (IMPUTED & PAID)
11	P E. RESTAURANTS & HOTELS
12	P.E NET EXPENDITURES ABROAD
13	P.E. OTHER SERVICES
14	CON MANUFACTURING
15	CON MINING, QUARRYING & OIL WELLS
16	CON HOUSING & REAL ESTATE COM
17	CON OTHER BUSINESS
18	CON GOVERNMENT
19	M&E MANUFACTURING
20	M&E MINING, qUARRYING & OIL WELLS
21	M&E OTHER BUSINESSES
22	M&E GOVERNMENT
23	INVENTORIES
24	DOMESTIC EXPORTS
25	RE-EXPORTS
26	IMPORTS
27	GOVT GROSS CURRENT EXPENDITURES
28	GOVT SALE OF GOODS & SERVICES

NOTE:

P.E.	=	PERSONAL EXPENDITURES
CON.	=	CONSTRUCTION EXPENDITURES
M&E	=	MACHINERY AND EQUIPMENT

APPENDIX C

LIST OF COMMODITIES

No.	COMMODITY TITLE DISAGGREGATED FOR AGRICULTURE (.)	No. COMMODITY M - AGGREGATION
1	CATTLE AND CALVES	2
2	SHEEP AND LAMBS	2
3	HOGS	2
4	POULTRY	2
5	OTHER LIVE ANIMALS	2
6	WHEAT,UNMILLED	1
7	BARLEY,OATS,CORN,GRAIN	1
8	MILK,WHOLE,FLUID,UNPROC	3
9	EGGS IN THE SHELL	3
10	HONEY AND BEESWAX	3
11	NUTS,EDIBLE,NOT SHELLED	3
12	FRUITS,FRESH,EX TROP.	3
13	VEGETABLES,FRESH	3
14	HAY,FORAGE,AND STRAW	3
15	SEEDS EX OIL AND SEED	3
16	NURSERY STOCK&REL.MAT.	3
17	OIL SEEDS,NUTS & KERN	3
18	HOPS INC. LUPULIN	3
19	TOBACCO,RAW	3
20	MINK SKINS,RANCH UND.	3
21	WOOL IN GREASE	3
22	SERV INC TO AGR.&FOR	3
23	FORESTRY PRODUCTS	4
24	FISH LANDINGS	5
25	HUNTING & TRAPP PROD.	6
26	IRON ORES & CONC	7
27	OTHER METAL ORES & CONC	8
28	COAL	9
29	CRUDE MINERAL OIL	10
30	NATURAL GAS	11
31	NON-METALLIC MINERALS	12
32	SERV INC TO MINING	13
33	BEEF,VEAL,MUTT&PORK,F&F	14
34	HORSE MEAT FRESH,FROZ	14
35	MEAT, CURED	14
36	MEAT PREP NOT CANNED	14
37	MEAT PREP CANNED	14
38	ANIM OILS & FATS&LARD	14
39	MARGARINE, SHORT. & LIKE PROD	14
40	SAUSAGE CASINGS, NATURAL & SYNTH.	14
41	PRIMARY TANKAGE	14
42	FEEDS OF ANIMAL ORIGIN NES	14
43	HIDES AND SKINS, RAW, NES	14
44	ANIMAL MAT FOR DRUGS & PERFUME	14
45	CUSTOM WORK MEAT & FOOD	14
46	POULTRY, FRESH, CHILLED, FROZEN	14
47	POULTRY, CANNED	14
48	MILK, WHOLE, FLUID, PROCESSED	15
49	CREAM, FRESH	15
50	BUTTER	15
51	CHEESE, CHEDDAR & PROCESSED	15
52	MILK EVAPORATED	15
53	ICE CREAM	15
54	OTHER DAIRY PRODUCTS	15
55	MUSTARD MAYONNAISE	15
56	FISH PRODUCTS	16
57	FRUIT, BERRIES, DRIED, CRYSTALLIZE	17
58	FRUITS & PREPARATIONS CANNED	17
59	VEGET.FROZEN, DRIED & PRESERVED	17
60	VEGETABLES & PREPARATIONS CANNED	17
61	SOUPS CANNED	17
62	INFANT & JUNIOR FOODS, CANNED	17
63	PICKLES, RELISHES, OTHEF SAUCES	17
64	VINEGAR	17
65	OTHER FOOD PREPARATIONS	17
66	PRIMARY OR CONCENTRATED FEEDS	18
67	FEED FOR COMMERCIAL LIVESTOCK	18
68	FEEDS, GRAIN ORIGIN, N E S	18
69	FEEDS OF VEGETABLE ORIGIN NES	18
70	PET FEEDS	18
71	WHEAT FLOUR	19
72	CEREAL & FLOUR OF OTHER CEREALS & VE	19
73	BREAKFAST CEREAL PRODUCTS	20
74	BISCUITS	20
75	BREAD & ROLLS	20
76	OTHER BAKERY PRODUCTS	20
77	COCOA & CHOCOLATE	22
78	NUTS,KERNELS & SEEDS PREPARED	22
79	CHOCOLATE CONFECTIONERY	22
80	OTHER CONFECTIONERY	22
81	BEET PULP	18
82	SUGAR	21
83	MOLASSES, SUGAR REFINERY PROD.	22
84	OILSEED, MEAL & CAKE	18
85	VEG. OILS & FATS, CRUDE	22
86	NITROGEN FUNCTION COMPOUNDS NES	67
87	MALT,MALT FLOUR&WHEAT STARCH	22
88	MAPLE SUGAR & SYRUP	22
89	PREPARED CAKE & SIMILAR MIXES	22
90	SOUPS,DRIED & SOUP MIXES & BASES	22
91	COFFEE, ROASTED, GROUND, PREPARED	22
92	TEA	22
93	POTATO CHIPS & SIMILAR PRODUCTS	22
94	MISC. FOOD NES	22
95	SOFTDRINK CONCENTRATES & SYRUPS	23
96	CARBONATED BEV ,SOFT DRINKS	23
97	ALCOHOLIC BEVERAGES DISTILLED	24
98	ALCOHOL, NATURAL, ETHYL	64
99	BREWERS'& DISTILLERS'GRAINS	18
100	ALE BEER, STOUT & PORTER	24
101	WINES	24
102	TOBACCO PROCESSED, UNMANUFACT.	24
103	CIGARETTES	26
104	TOBACCO MFG EX.CIGARETTES	26
105	TIRES & TUBES	27
106	OTHER RUBBER PRODUCTS	28
107	PLASTIC FABRICATED PRODUCTS	29
108	LEATHER & LEATHER PRODUCTS	30
109	YARNS & MAN MADE FIBRES	31
110	FABRICS	32
111	OTHER TEXTILE PRODUCTS	33
112	HOSIERY & KNITTED WEAR	34
113	CLOTHING & ACCESSORIES	35
114	LUMBER & TIMBER	36
115	VENEER AND PLYWOOD	37
116	OTHER WOOD FABRICATED MATERIALS	38
117	FURNITURE& FIXTURES	39
118	PULP	40

119	NEWSPRINT & OTHER PAPER STOCK	41
120	PAPER PRODUCTS	42
121	PRINTING & PUBLISHING	43
122	ADVERTISING, PRINT MEDIA	44
123	IRON & STEEL PRODUCTS	45
124	ALUMINUM PRODUCTS	46
125	COPPER & COPPER ALLOY PRODUCTS	47
126	NICKEL PRODUCTS	48
127	OTHER NON FERROUS METAL PRODUCTS	49
128	BOILERS, TANKS & PLATES	50
129	FABRICATED STRUCTURAL METAL PROD	51
130	OTHER METAL FABRICATED PRODUCTS	52
131	AGRICULTURAL MACHINERY	53
132	OTHER INDUSTRIAL MACHINERY	54
133	MOTOR VEHICLES	55
134	MOTOR VEHICLE PARTS	56
135	OTHER TRANSPORT EQUIPMENT	57
136	APPLIANCES & RECEIVERS, HOUSEHOLD	58
137	OTHER ELECTRICAL PRODUCTS	59
138	CEMENT & CONCRETE PRODUCTS	60
139	OTHER NON-METALLIC MINERAL PRODUCTS	61
140	GASOLINE & FUEL OIL	62
141	OTHER PETROLEUM & COAL PROD	63
142	INDUSTRIAL CHEMICALS	64
143	FERTILIZERS	65
144	PHARMACEUTICAL	66
145	OTHER CHEMICAL PRODUCTS	67
146	SCIENTIFIC EQUIPMENT	68
147	OTHER MANUFACTURED PRODUCTS	69
148	RESIDENTIAL CONSTRUCTION	70
149	NON-RESIDENTIAL CONSTRUCTION	71
150	REPAIR CONSTRUCTION	72
151	PIPELINE TRANSPORTATION	73
152	TRANSPORTATION & STORAGE	74
153	RADIO & TELEVISION BROADCASTING	75
154	TELEPHONE & TELEGRAPH	76
155	POSTAL SERVICES	77
156	ELECTRIC POWER	78
157	OTHER UTILITIES	79
158	WHOLESALE MARGINS	80
159	RETAIL MARGINS	81
160	IMPUTED RENT OWNER OCPD. DWEL	82
161	OTHER FINANCE, INS., REAL ESTATE	83
162	BUSINESS SERVICES	84
163	EDUCATION SERVICES	85
164	HEALTH SERVICES	86
165	AMUSEMENT & RECREATION SERVICES	87
166	ACCOMMODATION & FOOD SERVICES	88
167	OTHER PERSONAL & MISC. SERVICES	89
168	TRANSPORTATION MARGINS	90
169	OPERATING, OFFICE, LAB. & FOOD	91
170	TRAVEL, ADVERTISING & PROMOTION	92
171	NON-COMPETING IMPORTS	93
172	UNALLOCATED IMPORTS & EXPORTS	94
173	INDIRECT TAXES	95
174	SUBSIDIES	96
175	WAGES & SALARIES	97
176	SUPPLEMENTARY LABOUR INCOME	98
177	NET INCOME,UNINC. BUSINESS	99
178	OTHER OPERATING SURPLUS	100

APPENDIX D

ADJUSTMENTS IN CLOSING THE MODEL ON A PER COMMODITY BASIS

Table A3-1 Changes in the Value of Flows in the Make and Use Matrices due to adjustments in Closing the Model to the Household Sector (Model 1) ($ '000)

NO.	COMMODITY TITLE 1986 AGRICULTURE CANADA MODEL (MODEL 1)	HOUSEHOLD MAKE (1)	TOTAL(CONF) STATCAN MAKE (2)	MAKE NEW TOTAL (1+2)	HOUSEHOLD USE (3)	TOTAL(CONF) STATCAN USE (4)	USE NEW TOTAL (3+4)
1	CATTLE AND CALVES	0	3456055	3456055	110026	3272257	3382283
2	SHEEP AND LAMBS	0	24675	24675	3865	23160	27025
3	HOGS	0	2131006	2131006	25391	1997960	2023351
4	POULTRY	0	947440	947440	10585	932103	942688
5	OTHER LIVE ANIMALS	0	57609	57609	32945	33553	66498
6	WHEAT,UNMILLED	0	3778948	3778948	0	690012	690012
7	BARLEY,OATS,RYE,CORN,GRAI	0	2249824	2249824	0	1794986	1794986
8	MILK,WHOLE,FLUID,UNPROCES	0	2995419	2995419	16989	2979256	2996245
9	EGGS IN THE SHELL	0	468238	468238	348366	140224	488590
10	HONEY AND BEESWAX	0	75025	75025	37854	5830	43684
11	NUTS,EDIBLE,NOT SHELLED	0	2818	2818	13123	0	13123
12	FRUITS,FRESH, EX.TROPICAL	0	328415	328415	644937	179224	824161
13	VEGETABLES,FRESH	0	1116909	1116909	1099255	469600	1568855
14	HAY,FORAGE,AND STRAW	0	2364604	2364604	0	2372013	2372013
15	SEEDS EX. OIL AND SEED GR	0	104706	104706	15731	102930	118661
16	NURSERY STOCK & RELATED M	0	405488	405488	312052	157880	469932
17	OIL SEEDS,NUTS AND KERNEL	0	1067774	1067774	600	587111	587711
18	HOPS INC. LUPULIN	0	3874	3874	0	13129	13129
19	TOBACCO,RAW	0	206444	206444	0	366937	366937
20	MINK SKINS,RANCH UNDRESSE	0	43205	43205	0	46394	46394
21	WOOL IN GREASE	0	1418	1418	0	0	0
22	SERV. INCIDENTAL TO AGR.	0	708384	708384	230906	325294	556200
23	FORESTRY PRODUCTS	0	6472637	6472637	381636	6063114	6444750
24	FISH LANDINGS	0	1348046	1348046	59737	918930	978667
25	HUNTING & TRAPPING PRODUC	0	50428	50428	0	142170	142170
26	IRON ORES & CONCENTRATES	0	1291240	1291240	0	747518	747518
27	OTHER METAL. ORES & CONCE	0	6759293	6759293	0	4191255	4191255
28	COAL	0	1380531	1380531	16055	1289060	1305115
29	CRUDE MINERAL OIL	0	10894329	10894329	0	9774509	9774509
30	NATURAL GAS	0	5726234	5726234	1002130	2077979	3080109
31	NON-METALLIC MINERALS	0	2544884	2544884	42895	1342374	1385269
32	SERVICES INCIDENTAL TO MI	0	3515307	3515307	0	3517024	3517024
33	BEEF,VEAL,MUTT&PORK,FRESH	0	6278981	6278981	2964519	2822049	5786568
34	HORSE MEAT FRESH,CHILLED,	0	35686	35686	1686	0	1686
35	MEAT,CURED	0	829356	829356	594174	213913	808087

Table A3-1 (Continued)

NO.	COMMODITY TITLE 1986 AGRICULTURE CANADA MODEL (MODEL 1)	HOUSEHOLD MAKE (1)	TOTAL(CONF) STATCAN MAKE (2)	MAKE NEW TOTAL (1+2)	HOUSEHOLD USE (3)	TOTAL(CONF) STATCAN USE (4)	USE NEW TOTAL (3+4)
36	MEAT PREP. COOKED NOT CAN	0	1092452	1092452	800256	284702	1084
37	MEAT PREP. CANNED	0	128923	128923	96928	49799	14[illegible]
38	ANIMAL OILS & FATS & LARD	0	180806	180806	10386	111043	121429
39	MARGARINE,SHORTENING & LI	0	294186	294186	255602	150155	405757
40	SAUSAGE CASINGS, NATURAL	0	37325	37325	0	81751	81751
41	PRIMARY TANKAGE	0	34697	34697	0	1556	1556
42	FEEDS OF ANIMAL ORIGIN NE	0	105469	105469	0	112553	112553
43	HIDES AND SKINS,RAW,NES	0	223546	223546	0	70609	70609
44	ANIMAL MAT.FOR DRUGS & PE	0	55361	55361	0	31637	31637
45	CUSTOM WORK MEAT & FOOD	0	100711	100711	0	100711	100711
46	POULTRY,FRESH,CHILLED,FRO	0	1545800	1545800	1108011	486798	1594809
47	POULTRY,CANNED	0	12669	12669	15429	5636	21065
48	MILK,WHOLE,FLUID,PROCESSE	0	1995854	1995854	1595342	402035	1997377
49	CREAM,FRESH	0	268297	268297	136817	121237	258054
50	BUTTER	0	629060	629060	340130	291208	631338
51	CHEESE,CHEDDAR & PROCESSE	0	1660059	1660059	1287160	470569	1757729
52	MILK EVAPORATED	0	150969	150969	65594	38021	103615
53	ICE CREAM	0	426459	426459	399006	75025	474031
54	OTHER DAIRY PRODUCTS	0	844084	844084	463951	317661	781612
55	MUSTARD MAYONNAISE	0	63945	63945	199404	36126	235530
56	FISH PRODUCTS	0	2104926	2104926	504946	391855	896801
57	FRUIT,BERRIES,DRIED,CRYST	0	594998	594998	618667	336490	955157
58	FRUITS & PREPARATIONS CAN	0	223081	223081	287638	62003	349641
59	VEGET.FROZEN,DRIED & PRES	0	443564	443564	247298	94777	342075
60	VEGETABLES&PREPARATIONS C	0	507157	507157	472391	110386	582777
61	SOUPS CANNED	0	219991	219991	202880	28257	231137
62	INFANT&JUNIOR FOODS,CANNE	0	40513	40513	88449	0	88449
63	PICKLES,RELISHES,OTHER SA	0	398031	398031	387979	67821	455800
64	VINEGAR	0	31165	31165	25700	9011	34711
65	OTHER FOOD PREPARATIONS	0	317260	317260	519222	50676	569898
66	PRIMARY OR CONCENTRATED F	0	422312	422312	3180	424406	427586
67	FEED FOR COMMERCIAL LIVES	0	1633518	1633518	21285	1562007	1583292
68	FEEDS, GRAIN ORIGIN, N.E.	0	179768	179768	10088	150497	160585
69	FEEDS OF VEGETABLE ORIGIN	0	52393	52393	5623	12657	18280
70	PET FEEDS	0	348513	348513	397215	14580	411795
71	WHEAT FLOUR	0	732319	732319	73579	575531	649110
72	CEREAL&FLOUR OF OTHER CER	0	80814	80814	27010	58442	85452
73	BREAKFAST CEREAL PRODUCTS	0	341283	341283	337515	63029	400544

Table A3-1 (Continued)

NO.	COMMODITY TITLE 1986 AGRICULTURE CANADA MODEL (MODEL 1)	HOUSEHOLD MAKE (1)	TOTAL(CONF) STATCAN MAKE (2)	MAKE NEW TOTAL (1+2)	HOUSEHOLD USE (3)	TOTAL(CONF) STATCAN USE (4)	USE NEW TOTAL (3+4)
74	BISCUITS	0	502479	502479	409098	64605	473703
75	BREAD & ROLLS	0	1209777	1209777	971314	247545	1218859
76	OTHER BAKERY PRODUCTS	0	795136	795136	787433	126782	914215
77	COCOA & CHOCOLATE	0	100602	100602	38060	125887	163947
78	NUTS,KERNELS & SEEDS PREP	0	132062	132062	150670	104508	255178
79	CHOCOLATE CONFECTIONERY	0	462886	462886	551979	0	551979
80	OTHER CONFECTIONERY	0	402482	402482	485682	5127	490809
81	BEET PULP	0	0	0	0	7161	7161
82	SUGAR	0	457179	457179	45041	341217	386258
83	MOLASSES,SUGAR REFINERY P	0	371	371	3545	55652	59197
84	OILSEED,MEAL & CAKE	0	284430	284430	0	411167	411167
85	VEG. OILS & FATS, CRUDE	0	288086	288086	0	121524	121524
86	NITROGEN FUNCTION COMPOUN	0	2322	2322	0	226392	226392
87	MALT,MALT FLOUR&WHEAT STA	0	274056	274056	94649	227965	322614
88	MAPLE SUGAR & SYRUP	0	241719	241719	115020	64166	179186
89	PREPARED CAKE & SIMILAR M	0	191831	191831	158975	34543	193518
90	SOUPS,DRIED&SOUP MIXES&BA	0	91151	91151	102710	24558	127268
91	COFFEE, ROASTED, GROUND,	0	795189	795189	715300	184009	899309
92	TEA	0	113278	113278	86403	100818	187221
93	POTATO CHIPS & SIMILAR PR	0	390426	390426	414142	0	414142
94	MISC. FOOD NES	0	1225946	1225946	1004815	560604	1565419
95	SOFTDRINK CONCENTRATES &	0	341963	341963	5416	392749	398165
96	CARBONATED BEV.,SOFT DRIN	0	1380120	1380120	1308821	149444	1458265
97	ALCOHOLIC BEVERAGES DISTI	0	764614	764614	504495	93188	597683
98	ALCOHOL, NATURAL, ETHYL	0	0	0	385	18023	18408
99	BREWERS'& DISTILLERS'GRAI	0	19691	19691	0	10106	10106
100	ALE BEER, STOUT & PORTER	0	2183577	2183577	1991821	62788	2054609
101	WINES	0	245032	245032	548567	28586	577153
102	TOBACCO PROCESSED, UNMANU	0	387888	38 988	0	244480	244480
103	CIGARETTES	0	1121147	1121147	1143200	0	1143200
104	TOBACCO MFG EX.CIGARETTES	0	153153	153153	159471	6451	165922
105	TIRES & TUBES	0	1570050	1570050	280174	1237229	1517403
106	OTHER RUBBER PRODUCTS	0	716527	716527	208192	684647	892839
107	PLASTIC FABRICATED PRODUC	0	3595449	3595449	240056	3443793	3683849
108	LEATHER & LEATHER PRODUCT	0	1093603	1093603	1696706	358219	2054925
109	YARNS & MAN MADE FIBRES	0	1128293	1128293	126251	1531573	1657824
110	FABRICS	0	1439328	1439328	375792	2475444	2851236

Table A3-1 (Continued)

NO.	COMMODITY TITLE 1986 AGRICULTURE CANADA MODEL (MODEL 1)	HOUSEHOLD MAKE (1)	TOTAL(CONF) STATCAN MAKE (2)	MAKE NEW TOTAL (1+2)	HOUSEHOLD USE (3)	TOTAL(CONF) STATCAN USE (4)	USE NEW TOTAL (3+4)
111	OTHER TEXTILE PRODUCTS	0	2209369	2209369	1041231	1564464	2605695
112	HOSIERY & KNITTED WEAR	0	1222016	1222016	2116481	2748	2119229
113	CLOTHING & ACCESSORIES	0	4920542	4920542	5348889	767144	6116033
114	LUMBER & TIMBER	0	6341859	6341859	56699	2126215	2182914
115	VENEER AND PLYWOOD	0	896683	896683	41008	757076	798084
116	OTHER WOOD FABRICATED MAT	0	5284452	5284452	127306	4339416	4466722
117	FURNITURE& FIXTURES	0	3972247	3972247	2361890	310524	2672414
118	PULP	0	4631941	4631941	0	928234	928234
119	NEWSPRINT & OTHER PAPER S	0	9917639	9917639	9039	3809366	3818405
120	PAPER PRODUCTS	0	5837827	5837827	1585338	4734939	6320277
121	PRINTING & PUBLISHING	0	7071386	7071386	2290853	5585401	7876254
122	ADVERTISING, PRINT MEDIA	0	2607625	2607625	0	2607891	2607891
123	IRON & STEEL PRODUCTS	0	7978535	7978535	0	8328421	8328421
124	ALUMINUM PRODUCTS	0	1616367	1616367	0	1975601	1975601
125	COPPER & COPPER ALLOY PRO	0	1544209	1544209	0	737561	737561
126	NICKEL PRODUCTS	0	0	0	0	29026	29026
127	OTHER NON FERROUS METAL P	0	880534	880534	0	1182679	1182679
128	BOILERS, TANKS & PLATES	0	882545	882545	0	495097	495097
129	FABRICATED STRUCTURAL MET	0	3195892	3195892	0	2783754	2783754
130	OTHER METAL FABRICATED PR	0	8682282	8682282	623721	9210342	9834063
131	AGRICULTURAL MACHINERY	0	762774	762774	129837	293051	422888
132	OTHER INDUSTRIAL MACHINER	0	9514665	9514665	656249	6733881	7390130
133	MOTOR VEHICLES	0	7775664	7775664	11450474	61612	11512086
134	MOTOR VEHICLE PARTS	0	12045441	12045441	846397	19722640	20569037
135	OTHER TRANSPORT EQUIPMENT	0	4567065	4567065	428370	2186337	2614707
136	APPLIANCES & RECEIVERS, H	0	1973888	1973888	4317055	792741	5109796
137	OTHER ELECTRICAL PRODUCTS	0	8062252	8062252	665160	6747173	7412333
138	CEMENT & CONCRETE PRODUCT	0	3147689	3147689	55353	2838797	2894150
139	OTHER NON-METALLIC MINERA	0	2564501	2564501	519505	3175857	3695362
140	GASOLINE & FUEL OIL	0	12122106	12122106	4886334	6917323	11803657
141	OTHER PETROLEUM & COAL PR	0	3717102	3717102	339871	4228459	4568330
142	INDUSTRIAL CHEMICALS	0	6175425	6175425	6376	7499353	7505729
143	FERTILIZERS	0	1524668	1524668	80494	1056545	1137039
144	PHARMACEUTICAL	0	2323905	2323905	1281523	548133	1829656
145	OTHER CHEMICAL PRODUCTS	0	5778037	5778037	2436041	4969110	7405151
146	SCIENTIFIC EQUIPMENT	0	1461462	1461462	1333173	1807350	3140523
147	OTHER MANUFACTURED PRODUC	0	4027140	4027140	3265456	1958137	5223593

Table A3-1 (Continued)

NO.	COMMODITY TITLE 1986 AGRICULTURE CANADA MODEL (MODEL 1)	HOUSEHOLD MAKE (1)	TOTAL(CONF) STATCAN MAKE (2)	MAKE NEW TOTAL (1+2)	HOUSEHOLD USE (3)	TOTAL(CONF) STATCAN USE (4)	USE NEW TOTAL (3+4)
148	RESIDENTIAL CONSTRUCTION	0	24995574	24995574	0	0	0
149	NON-RESIDENTIAL CONSTRUCT	0	35364444	35364444	0	0	0
150	REPAIR CONSTRUCTION	0	10654800	10654800	132500	8098785	8231285
151	PIPELINE TRANSPORTATION	0	3283721	3283721	659506	2075684	2735190
152	TRANSPORTATION & STORAGE	0	33714828	33714826	6251230	25974178	32225408
153	RADIO & TELEVISION BROADC	0	2721602	2721602	949485	1800071	2749556
154	TELEPHONE & TELEGRAPH	0	11258207	11258207	4494446	5854903	10349349
155	POSTAL SERVICES	0	2787636	2787636	591593	1842094	2433687
156	ELECTRIC POWER	0	15711519	15711519	5899831	7583853	13483684
157	OTHER UTILITIES	0	2456771	2456771	1952779	2061955	4014734
158	WHOLESALE MARGINS	0	34683148	34683146	10647339	15885570	26532909
159	RETAIL MARGINS	0	35416516	35416516	31978327	2214679	34193006
160	IMPUTED RENT OWNER OCPD.	0	37641200	37641200	37641200	0	37641200
161	OTHER FINANCE,INS.,REAL E	0	68217664	68217660	29643744	33859672	63503416
162	BUSINESS SERVICES	0	24960486	24960485	1341625	21470008	22811633
163	EDUCATION SERVICES	0	1440112	1440112	2057124	2255	2059379
164	HEALTH SERVICES	0	12122906	12122906	6320965	44422	6365387
165	AMUSEMENT & RECREATION SE	0	6004793	6004793	5218911	1428739	6647650
166	ACCOMMODATION & FOOD SERV	0	20818068	20818067	17782694	3255722	21038416
167	OTHER PERSONAL & MISC. SE	0	25553898	25553898	12276610	12665342	24941952
168	TRANSPORTATION MARGINS	0	15127627	15127627	2200707	6646261	8846968
169	OPERATING, OFFICE, LAB. &	0	20259246	20259246	979809	15072163	16051972
170	TRAVEL, ADVERTISING & PRO	0	16759408	16759408	499240	14228846	14728086
175	WAGES & SALARIES	247891072	0	247891072	10218935	181571632	191790567
176	SUPPLEMENTARY LABOUR INCO	26866100	0	26866100	826150	18135982	18962132
177	NET INCOME,UNINC. BUSINES	33048544	0	33048544	0	33048544	33048544
178A	NET INVESTMENT INCOME	55235000	0	55235000	314000	54921000	55235000
180	GOVERNMENT TRANSFERS	61596000	0	61596000	n.a.	n.a.	n.a.
171	NON-COMPETING IMPORTS	0	0	0	433134	733448	1166582
172	UNALLOCATED IMPORTS & EXP	0	0	0	119300	1832408	1951708
173	INDIRECT TAXES	0	0	0	22946655	33069874	56016529
174	SUBSIDIES	0	0	0	0	-10523541	-10523541
178B	OTHER OPERATING SURPLUS	0	0	0	437432	80170904	80608336
	SUB-TOTAL FOR USE MATRIX	n.a.	n.a.	n.a.	296809715	783236130	1080045845
179	SAVINGS	n.a.	n.a.	n.a.	127827001	n.a.	127827001

Table A3-1 (Continued)

NO. COMMODITY TITLE 1986 AGRICULTURE CANADA MODEL (MODEL 1)	HOUSEHOLD MAKE	TOTAL(CONF) STATCAN MAKE	MAKE NEW TOTAL	HOUSEHOLD USE	TOTAL(CONF) STATCAN USE	USE NEW TOTAL
	(1)	(2)	(1+2)	(3)	(4)	(3+4)
TOTAL CLOSED MODEL	424636716	783236130	1207872846	424636716	783236130	1207872846

n.a.: non-applicable

APPENDIX E

COMPUTER PROGRAMS

PROGRAM FORMAT 1 - MARGIN.PRG

```
/* ************************************************************** */
/* FILE MARG\MARGIN.PRG                                           */
/*                                                                */
/*                                                                */
/* THIS PROGRAM COMPUTES THE MARGINS OF A FINAL DEMAND VECTOR     */
/* THE FD VECTOR MUST BE IN PURCHASERS' PRICES                    */
/* THE RESULT IS A FD VECTOR TO BE USED WITH A MODEL IN           */
/* PRODUCERS' PRICES                                              */
/* ************************************************************** */

OUTPUT FILE = B:\MARG\FDPETRO.OUT RESET;

/* 1. SPECIFICATION OF VECTOR SIZE */

LOAD FDPURCH[214,1] = B:\MARG\FDPURCHT.DAT;
LOAD PIPELINE[214,1] = B:\MARG\PIPELINE.DAT;
LOAD STORAGE[214,1] = B:\MARG\STORAGE.DAT;
LOAD WHOLE[214,1] = B:\MARG\WHOLE.DAT;
LOAD RETAIL[214,1] = B:\MARG\RETAIL.DAT;
LOAD TSP[214,1] = B:\MARG\TSP.DAT;
LOAD TAX[214,1] = B:\MARG\TAX.DAT;
LOAD GAS[214,1] = B:\MARG\GAS.DAT;
LOAD NUMB[214,1] = B:\MARG\COMNUMB.DAT;
LOAD ZEROI[150,1] = B:\MARG\ZEROI.DAT;
LOAD ZEROII[4,1] = B:\MARG\ZEROII.DAT;
LOAD ZEROIII[8,1] = B:\MARG\ZEROIII.DAT;
LOAD ZEROIV[43,1] = B:\MARG\ZEROV.DAT;
LOAD ZEROV[2,1] = B:\MARG\ZEROV.DAT;

/* 2. MULTIPLICATION OF PURCHASERS' PRICES BY MARGIN COEFFICIENTS */

P = PIPELINE .* FDPURCH;
S = STORAGE .* FDPURCH;
W = WHOLE .* FDPURCH;
R = RETAIL .* FDPURCH;
TS = TSP .* FDPURCH;
TA = TAX .* FDPURCH;
G = GAS .* FDPURCH;

/* 3. COMPUTATION OF A FD VECTOR IN PRODUCERS' PRICES */

PEXMI = P+S+W+R+TS+TA+G;
PEXM = FDPURCH-PEXMI;

/* 4. ESTIMATION OF EACH MARGIN'S TOTAL */

PURCHA = SUMC(FDPURCH);
RP = SUMC(P);
RS = SUMC(S);
RW = SUMC(W);
RR = SUMC(R);
RTS = SUMC(TS);
RTA = SUMC(TA);
RG = SUMC(G);

/* 5. ASSEMBLY OF THE NEW FD VECTOR IN PRODUCERS' PRICES */

TOT = ZEROI|RP|RS|ZEROII|RG|RW|RR|ZEROIII|RTS|ZEROIV|RTA|ZEROV;

/* 6. VEFIFICATION OF VECTORS CONTROL TOTALS */

FDPROD = PEXM + TOT;
FDSUM = SUMC(FDPROD);

/* 7. SPECIFICATION OF STATEMENTS FOR FINAL PRINTOUT */

SPEC1 = NUMB~FDPURCH~FDPROD;

/* 8. PRINT STATEMENTS */
```

```
PRINT "RE-ALLOCATION OF MARGINS TO THEIR SPECIFIC COMMODITY";
PRINT " ";
PRINT "        INDUSTRY       PURCHASERS'     PRODUCERS'";
PRINT "        NUMBERS        PRICES          PRICES";
PRINT "                         (M$)            (M$)";
PRINT " ";
PRINT "        ____________________________________________";
PRINT " ";
PRINT SPEC1;
PRINT " ";
PRINT " ";
PRINT "SUMMATION OF THE TWO TYPES OF VECTORS (M$)";
PRINT " ";
PRINT "TOTAL IN PURCHASERS' PRICES IS: " PURCHA;
PRINT "TOTAL IN PRODUCERS' PRICES IS:  " FDSUM;
PRINT " ";
PRINT " ";
PRINT "INDIVIDUAL MARGIN TOTALS (M$)";
PRINT " ";
PRINT "PIPELINE MARGINS ARE:       " RP;
PRINT "STORAGE MARGINS ARE:        " RS;
PRINT "WHOLESALE MARGINS ARE:      " RW;
PRINT "RETAIL MARGINS ARE:         " RR;
PRINT "TRANSPORTATION MARGINS ARE: " RTS;
PRINT "INDIRECT TAXES ARES:        " RTA;
PRINT "GASOLINE MARGINS ARE:       " RG;

/* 9. SAVE THE OUTPUT INTO A FILE */

SAVE B:\MARG\FDPRODT= FDPROD;
END;
```

PROGRAM FORMAT 2 - IMPACT.PRG

```
NEW 200,500000;
/* ************************************************** */
/* THIS PROGRAM CREATES AN IMPACT MATRIX              */
/* FOR A SINGLE HOUSEHOLD SECTOR                      */
/*                                                    */
/* FILE DHPRG\IMPACT.PRG                              */
/* ************************************************** */

OUTPUT FILE = D:\DHOUT\IMPACT.OUT RESET;

/* 1. LOAD REQUIRED DATA FILES */

/* LOAD USE MATRIX */
LOAD UG1[209,21] = D:\DHDATA\UG1.DAT;
LOAD UG2[209,21] = D:\DHDATA\UG2.DAT;
LOAD UG3[209,21] = D:\DHDATA\UG3.DAT;
LOAD UG4[209,22] = D:\DHDATA\UG4.DAT;
B = UG1~UG2~UG3~UG4;
CLEAR UG1, UG2, UG3, UG4;

/* LOAD MAKE MATRIX */
LOAD VQ1[209,21] = D:\DHDATA\VQ1.DAT;
LOAD VQ2[209,21] = D:\DHDATA\VQ2.DAT;
LOAD VQ3[209,21] = D:\DHDATA\VQ3.DAT;
LOAD VQ4[209,22] = D:\DHDATA\VQ4.DAT;
D = (VQ1~VQ2~VQ3~VQ4)';
CLEAR VQ1, VQ2, VQ3, VQ4;

/* LOAD LEAKAGES */
LOAD LEAK[209,1] = D:\DHDATA\LEAK.DAT;
LET ZERO[209,209];
LK = DIAGRV(ZERO,LEAK);
CLEAR ZERO;

/* 2. OPERATIONS ON MATRICES */
DLKB = D*LK*B;
CLEAR LK, B;
LET IND[85,1] = 1;
LET ZERO[85,85];
I = DIAGRV(ZERO,IND);
IDLKB = I - DLKB;
CLEAR DLKB, ZERO, I;
LEONTIEF = INV(IDLKB);
CLEAR IDLKB;
IMPACT = LEONTIEF*D;

/* 3. SAVE THE IMPACT MATRIX INTO A GAUSS DATA FILE */

SAVE D:\DHDATA\IMPACT = IMPACT;
SHOW;
END;
```

PROGRAM FORMAT 3 - ANALYSIS.PRG

```
NEW 200,500000;
/* ******************************************************** */
/* FILE DHPRG\ANALYSIS.PRG                                  */
/*                                                          */
/* THIS PROGRAM APPROXIMATES THE DIRECT+INDIRECT+INDUCED    */
/* EFFECTS OF A CHANGE IN FINAL DEMAND                      */
/*                                                          */
/* ******************************************************** */

OUTPUT FILE = D:\DHOUT\DHPETRO.OUT RESET;

/* 1. LOAD REQUIRED DATA FILES */
LOAD EMPCT[85,1] = D:\DHDATA\EMPCOEFT.DAT;
LOAD EMPCP[85,1] = D:\DHDATA\EMPCOEFP.DAT;
LOAD EMPCN[85,1] = D:\DHDATA\EMPCOEFN.DAT;
LOAD GDPCF[85,1] = D:\DHDATA\GDPCOEF.DAT;
LOAD INDUSTRY[85,1] = D:\DHDATA\INDUSTRY.DAT;
LOADM PATH = D:\DHDATA;
LOADM IMPACT = D:\DHDATA\IMPACT.FMT;
LOADM FDPRODT = D:\DHDATA\FDPRODT.FMT;
FDPROD = FDPRODT[1:209,1];

/* 2. OPERATIONS ON MATRICES */
g = IMPACT*FDPROD;
CLEAR IMPACT, FDPROD;
LET ZERO[85,85];
ECT = DIAGRV(ZERO,EMPCT);
ECP = DIAGRV(ZERO,EMPCP);
ECN = DIAGRV(ZERO,EMPCN);
ET = ECT*g;
EP = ECP*g;
EN = ECN*g;
CLEAR ECT, ECP, ECN;
GDPC = DIAGRV(ZERO,GDPCF);
GDP = GDPC*g;
CLEAR GDPC, ZERO;

/* 3. SPECIFICATION OF STATEMENTS FOR PRINT */
EMPLOY = INDUSTRY~EN~EP~ET;
INCOME = INDUSTRY~g~GDP;
AET = ET[1:12,1];
AEP = EP[1:12,1];
AEN = EN[1:12,1];
AG =  G[1:12,1];
AGDP = GDP[1:12,1];
FET = ET[19:34,1];
FEP = EP[19:34,1];
FEN = EN[19:34,1];
FG = G[19:34,1];
FGDP = GDP[19:34,1];
HET = ET[75:85,1];
HG = G[75:85,1];
HGDP = GDP[75:85,1];

/* TOTALS */
SEN = SUMC(EN);
SEP = SUMC(EP);
SET = SUMC(ET);
SG = SUMC(G);
SGDP = SUMC(GDP);
SAET = SUMC(AET);
SAEP = SUMC(AEP);
SAEN = SUMC(AEN);
SAG = SUMC(AG);
SAGDP = SUMC(AGDP);
SFET = SUMC(FET);
SFEP = SUMC(FEP);
SFEN = SUMC(FEN);
SFG = SUMC(FG);
SFGDP = SUMC(FGDP);
```

```
SHET = SUMC(HET);
SHG = SUMC(HG);
SHGDP = SUMC(HGDP);
/* 4. PRINT STATEMENTS */
PRINT "DIRECT + INDIRECT + INDUCED EFFECTS ON EMPLOYMENT";
PRINT " ";
PRINT "DISAGGREGATED HOUSEHOLD SECTOR";
PRINT "11 INCOME GROUPS";
PRINT " ";
PRINT "       INDUSTRY          NON-PAID       PAID              TOTAL";
PRINT "       NUMBERS           EMPLOYMENT     EMPLOYMENT        EMPLOYMENT";
PRINT " ";
PRINT "       ____________________________________________________________";
PRINT " ";
PRINT EMPLOY;
PRINT " ";
PRINT "TOTAL NON-PAID EMPLOYMENT IS:                  " SEN;
PRINT "TOTAL PAID EMPLOYMENT IS:                      " SEP;
PRINT "TOTAL EMPLOYMENT IS:                           " SET;
PRINT " ";
PRINT "TOTAL NON-PAID EMPLOYMENT IN AGRICULTURE IS:   " SAEN;
PRINT "TOTAL PAID EMPLOYMENT IN AGRICULTURE IS:       " SAEP;
PRINT "TOTAL EMPLOYMENT IN AGRICULTURE IS:            " SAET;
PRINT " ";
PRINT "TOTAL NON-PAID EMPLOYMENT IN FOOD PROC. IND IS: " SFEN;
PRINT "TOTAL PAID EMPLOYMENT IN FOOD PROC. IND IS:    " SFEP;
PRINT "TOTAL EMPLOYMENT IN FOOD PROC. IND IS:         " SFET;
PRINT " ";
PRINT "TOTAL EMPLOYMENT IN HOUSEHOLDS:                " SHET;
PRINT " ";
PRINT " ";
PRINT "DIRECT + INDIRECT + INDUCED EFFECTS ON INCOME";
PRINT " ";
PRINT "DISAGGREGATED HOUSEHOLD SECTOR";
PRINT " ";
PRINT "       INDUSTRY          TOTAL              TOTAL";
PRINT "       NUMBER            INCOME             GDP";
PRINT " ";
PRINT "       ____________________________________________";
PRINT " ";
PRINT INCOME;
PRINT " ";
PRINT "TOTAL INCOME IS:                          " SG;
PRINT "TOTAL GDP IS:                             " SGDP;
PRINT " ";
PRINT "TOTAL INCOME IN AGRICULTURE IS:           " SAG;
PRINT "TOTAL GDP IN AGRICULTURE IS:              " SAGDP;
PRINT " ";
PRINT "TOTAL INCOME IN FOOD PROCESSED IND IS:    " SFG;
PRINT "TOTAL GDP IN FOOD PROCESSED IND IS:       " SFGDP;
PRINT " ";
PRINT "TOTAL INCOME IN HOUSEHOLDS IS:            " SHG;
PRINT "TOTAL GDP IN HOUSEHOLDS IS:               " SHGDP;
PRINT " ";
PRINT " ";
PRINT "CHARACTERISTICS OF PARAMETERS";
SHOW;
END;
```

APPENDIX F

LIST OF I-O AND FAMEX COMMODITY CORRESPONDENCE

TABLE A4-1 LISTING OF FAMEX COMMODITIES ALLOCATED TO I-O COMMODITIES

I-O	FAMEX CODE	ITEM
5	H2233	PURCHASE OF PETS & RELATED GOODS
9	F1180	EGGS
10	F1481	HONEY
11	F1290	UNSHELLED NUTS
12	F1220	APPLES
12	F1233	STRAWBERRIES
12	F1234	OTHER FRESH FRUIT
13	F1300-1320	FRESH VEGETABLES
15	H2270	SEEDS
16	H2271	NURSERY & GREENHOUSE STOCK
16	H2272	POTTED PLANTS, CUT FLOWERS, ETC.
22	H2275	HORTICULTURAL SERVICES & SNOW REMOVAL
23	S2094	FUEL WOOD
30	S2092	PIPED GAS
33	F1000-1007	BEEF
33	F1010-1015	PORK
33	F1020-1050	OTHER FRESH OR FROZEN MEAT
33	F1050	OTHER MEAT (EXCL. POULTRY)
35	F1070-1073	CURED MEAT
36	F1080-1086	PREPARATION & COOKED MEAT
37	F1090-1092	PREP. MEAT, CANNED
38	F1432	LARD
39	F1430	MARGARINE
39	F1431	SHORTENING
39	F1433	COOKING/SALAD OIL
46	F1060-1062	POULTRY, FRESH OR FROZEN MEAT
48	F1161	FLUID WHOLE MILK
48	F1162	LOW-FAT MILK (2%)
48	F1163	FLUID SKIM MILK
49	F1160	CREAM (EX. SOUR CREAM)
50	F1166	BUTTER
51	F1167-1171	CHEESE
52	F1174	CONDENSED OR EVAPORATED MILK
53	F1175	ICE CREAM & ICE MILK
53	F1176	OTHER ICE CREAM NOVELTIES
54	F1165	YOGURT
54	F1173	SKIM MILK POWDER

TABLE A4-1 (Continued)

I-O	FAMEX CODE	ITEM
54	F1177	OTHER DAIRY PRODUCTS
55	F1374	MAYONNAISE & SALAD DRESSINGS
56	F1110-1150	FISH & OTHER MARINE PRODUCTS
57	F1240-1241	FROZEN FRUIT
57	F1250-1254	DRIED OR OTHER PRESERVED FRUIT
57	F1260-1263	FRUIT JUICE (EXCL. CONCENTRATES)
57	F1270-1271	CONCENTRATED FRUIT JUICE
58	F1280-1287	CANNED FRUIT & FRUIT PREPARATIONS
59	F1330-1334	FROZEN VEGETABLES
59	F1340	DRIED VEGETABLES
60	F1350-1361	CANNED VEGETABLES & VEGETABLE PREP.
61	F1440	CANNED SOUP
62	F1450	CANNED INFANT OR JUNIOR FOODS
62	F1452	INFANT FORMULA
63	F1370	PICKLES (INCL. OLIVES)
63	F1372	KETCHUP
63	F1373	OTHER SAUCES & SAUCE MIXES
64	F1375	OTHER CONDIMENTS (INCL. VINEGAR)
65	F1200	CANNED PASTA PRODUCTS
65	F1202	PASTA MIXES
65	F1460-1463	PRE-COOKED FROZEN FOOD PREPARATION
70	H2230	CATS & DOGS, CANNED
70	H2231	CANNED DOG & CAT FOOD
70	H2232	OTHER CAT & DOG FO
71	F1211-1212	FLOUR
72	F1214	OTHER GRAINS, UNMILLED OR MILLED
72	F1217	OTHER CEREAL PRODUCTS
73	F1215	BREAKFAST CEREAL
74	F1193	COOKIES & SWEET BISCUITS
75	F1190	BREAD
75	F1192	CRACKERS & CRISP BREADS
76	F1191	UNSWEETENED ROLLS & BUNS
76	F1194	DOUGHNUTS
76	F1195	YEAST-RAISED SWEET GOODS
76	F1196	DESSERT PIES, CAKES & OTHER PASTRIES
76	F1197	OTHER BAKERY PRODUCTS
78	F1291	SHELLED PEANUTS
78	F1292	OTHER SHEELED NUTS
79	F1391	CHOCOLATE BARS
79	F1392	OTHER CONFECTIONS
80	F1390	GUM

TABLE A4-1 (Continued)

I-O	FAMEX CODE	ITEM
80	F1393	SUGAR CANDY
80	F1394	OTHER SUGAR CONFECTIONS
80	F1395	OTHER SUGAR PREPARATIONS
82	F1380	SUGAR
83	F1381	SYRUPS & MOLASSES
87	F1210	RICE (INCL. MIXES)
89	F1216	CAKE & OTHER FLOUR-BASED MIXES
89	F1487	JELLY POWDERS
89	F1488	PREPARED DESSERT POWDERS
89	F1491	CANNED PUDDINGS & CUSTARDS
89	TOTAL	
90	F1441	DRIED SOUP
91	F1410-1411	COFFEE
92	F1420	TEA
93	F1489	POTATO CHIPS & SIMILAR PRODUCTS
94	F1201	DRY OR FRESH PASTA
94	F1376	SPICES
94	F1470	MATERIALS FOR FOOD PREPARATION
94	F1482	PEANUT BUTTER
94	F1483	DAIRY PRODUCT SUBSTITUTES
94	F1484	FLAVOURING EXTRACTS & ESSENCES
94	F1485	FLAVOURING POWDERS & CRYSTALS
94	F1486	FOOD SEASONINGS (INCL. SALT)
94	F1490	FOOD DRINK POWDERS
94	F1492	ALL OTHER FOOD PREPARATION
96	F1502	OTHER NON-ALCOHOLIC BEVERAGES
96	F1501	FRUIT DRINKS
96	F1500	CARBONATED BEVERAGES
97	TA3515	LIQUOR
100	TA3510-3515	ALCOHOLIC BEVERAGES
101	TA3514	WINE & CIDRE
103	TA3502	CIGARETTES
104	TA3500-3503	TOBACCO PRODUCTS & SMOKERS' SUPPLIES
105	T2932	TIRES
108	C2500	LEATHER COATS & JACKETS
108	C2580-2583	FOOTWEAR
108	C2591	LEATHER COATS & JACKETS
108	C2660-2663	FOOTWEAR
108	C2670	LEATHER OR FUR COATS & JACKETS
108	C2750-2753	FOOTWEAR
108	C2761	LEATHER OR FUR COATS & JACKETS
108	C2810-2813	FOOTWEAR
108	C2850	FOOTWEAR

TABLE A4-1 (Continued)

I-O	FAMEX CODE	ITEM
110	C2860-2864	CLOTHING MATERIAL (EX. HOUSEHOLD TEXTILE)
110	C2865	NOTIONS
111	E2320-2329	HOUSEHOLD TEXTILES & RELATED MATERIALS
111	E2330	ROOM-SIZE & AREA RUGS & MATS
112	C2552	HOSIERY
112	C2632	HOSIERY
112	C2790	SOCKS
112	C2824	SOCKS, OTHER HOSIERY & UNDERWEAR
+		
113	C2500-2504	COATS& JACKETS
113	C2510-2511	SUITS & DRESSES
113	C2520-2526	SPORTSWEAR
113	C2530-2532	ACTIVE SPORTSWEAR
113	C2540	OTHER SPECIALIZED CLOTHING
113	C2550-2554	LINGERIE, HOSIERY & SLEEPWEAR
113	C2560-2563	OTHER APPAREL & ACCESSORIES
113	C2590-2595	OUTERWEAR
113	C2600-2601	SUITS & DRESSES
113	C2610-2611	PANTS (INCL. SHORTS)
113	C2620-2622	BLOUSES, T-SHIRTS & SWEATERS
113	C2630-2634	UNDERWEAR, SLEEPWEAR, HOSIERY ETC.
113	C2640-2650	OTHER APPAREL, ACCESSORIES & JEWELLERY
113	C2670-2673	COATS & JACKETS
113	C2680-2681	SUITS & SPORT JACKETS
113	C2690-2691	PANTS
113	C2700-2706	FURNISHINGS
113	C2710-2711	ACTIVE SPORTSWEAR
113	C2720	OTHER SPECIALIZED CLOTHING
113	C2730-2733	OTHER APPAREL & ACCESSORIES
113	C2760-2766	OUTERWEAR
113	C2770-2771	PANTS (INCL. SHORTS)
113	C2780-2783	SHIRTS, T-SHIRTS & SWEATERS
113	C2790-2792	UNDERWEAR, SLEEPWEAR, LOUNGEWEAR & SOCKS
113	C2800-2808	OTHER APPAREL, ACCESSORIES & JEWELLERY
113	C2820-2825	DAYWEAR
113	C2830	SLEEPWEAR
113	C2840	OTHER INFANTS' WEAR
117	E2300-2318	FURNITURE
117	E2480-2483	ATTACHMENTS & PARTS PURCHASED SEPARATELY
120	H2260	PAPER TOWELS
120	H2261	FACIAL & BATHROOM TISSUE
120	H2262	GREETING CARDS & POSTCARDS
120	H2263	STATIONERY
120	H2264	GIFT-WRAP PAPER
120	H2265	OTHER PAPER SUPPLIERS
120	H2266	PLASTIC GARBAGE BAGS
120	H2267	OTHER PLASTIC SUPPLIES
120	H2268	FOIL SUPPLIES
120	H2282	OFFICE-TYPE SUPPLIES N.E.S.
120	H2283	OTHER SUPPLIES
120	ED3390-3392	SCHOOL SUPPLIES
121	RE3380-3386	READING MATERIAL
121	ED3393-3395	MANUALS
130	E2453-2454	OTHER LAWN & GARDEN TOOLS & EQIPMENT

TABLE A4-1 (Continued)

I-O	FAMEX CODE	ITEM
130	M3610	TOOLS & EQUIPMENT PURCHASED FOR WORK
130	P3123	DISPOSABLE RAZORS & RAZOR BLADES
130	P3124	DISPOSABLE DIAPERS
131	E2450-2454	LAWN, GARDEN & SNOW REMOVAL TOOLS & EQUIPMENT
133	R3285	MOTOR HOMES
133	R3286	TRUCK CAMPERS
133	T2900-2904	PURCHASE OF AUTOMOBILES & TRUCKS
134	T2911	OTHER ACCESSORIES
134	T2934	OTHER MAINTENANCE & REPAIR SUPPLIES
135	R3281	TRAVEL TRAILERS
135	R3282	TENT TRAILERS
135	R3283	MOTORCYCLES
135	R3284	SNOWMOBILES
135	R3287	BOATS (INCL. CANNOES)
135	R3288	OTHER RECREATION VEHICULES
135	R3290	PURCHASE OF ACCESSORIES & ATTACHEMENTS
135	R3289	OUTBOARD MOTORS
136	E2360-2363	AIR CONDITIONING & REFRIGERATION
136	E2370-2375	APPLIANCES FOR COOKING & WARMING FOOD
136	E2380	ELECTRIC APPLIANCES FOR FOOD PREPARATION
136	E2390-2393	APPLIANCES FOR LAUNDRY
136	E2400-2403	OTHER ELECTRIC EQUIPMENT & APPLIANCES
136	E2451	POWER LAWN-MOWERS
136	P3130-3131	PERSONAL CARE ELECTRIC EQUIPMENT
136	P3140	OTHER PERSONAL CARE SUPPLIES & EQUIPMENT
136	R3301	RADIO
136	R3302	RADIO COMPONENTS
136	R3303	RADIO COMBINATIONS
136	R3306	TELEVISION SETS
136	R3307	VIDEO TAPES RECORDERS/PLAYERS
136	R3308	TELEVISION/VDEO COMPONENTS
136	R3310	OTHER HOME ENTERTAINMENT EQUIPMENT
136	R3311	PARTS PUCHASED SEPARATELY
136	T2910	AUTOMOBILES RADIO & TAPE PLAYERS
136	E2420-2423	NON-ELECTRIC KITCHEN & COOKING EQUIPMENT
136	E2460-2470	OTHER HOUSEHOLD EQUIPMENT
136	E2440-2442	HOME & WORKSHOP TOOLS & EQUIPMENT
137	E2410	PORTABLE ELECTRIC LAMPS
137	H2280	ELECTRIC LIGHT BULBS & TUBES
137	H2281	DRY-CELL BATTERIES
137	T2933	BATTERIES
137	S2036-2037	ELECTRICAL SYSTEMS, MAINTENANCE
140	R3292	FUELS
140	S2091	FUEL OIL & OTHER LIQUID FUEL
140	T2917	GAS & OTHER FUELS
140	T2921	GAS & OTHER FUELS
140	T2930	AUTOMOTIVE FUELS
140	S2093	BOTTLED GAS
140	S2095	OTHER FUEL AND HEATING COSTS
143	H2274	FERTILIZERS, SOIL, & SOIL CONDITIONERS
144	H3000	HEALTH CARE SUPPLIES
144	H3001-3002	MEDICINAL & PHARMACEUTICAL PRODUCTS

TABLE A4-1 (Continued)

I-O	FAMEX CODE	ITEM
144	H3011	PHYSICIAN'S CARE
144	H3020-3023	EYE-CARE GOODS & SERVICES
144	H3030	OTHER HEALTH CARE GOODS
145	H2240-2242	DETERGENT & SOAP (EXCL. PERSONAL CARE)
145	H2243-2246	CLEANING & POLISHING PREPARATION
145	H2247-2250	CHEMICAL SPECIALTIES
145	H2273	HERBICIDES, INSECTICIDES & RIDENTICIDES
145	P3100-3114	TOILET PREPARATIONS & COSMETICS
145	P3120	TOOTHPASTE
145	P3121	OTHER ORAL HYGIENE PRODUCTS
145	P3122	TOILET & OTHER PERSONAL SOAP
146	C2570	WATCHES
146	C2648	WATCHES
146	C2740	WATCHES
146	C2806	WATCHES
146	E2469	CLOCKS, TIMERS, KITCHEN SCALES ETC.
146	R3224-3226	COMPUTER EQUIP. & SUPPLIES
146	R3230-3236	PHOTOGRAPHIC GOODS & SERVICES
147	C2570-2572	JEWELLERY
147	C2649-2650	JEWELLERY
147	C2741	PRECIOUS JEWELLERY
147	C2742	OTHER JEWELS
147	C2807	PRECIOUS JEWELLERY
147	C2808	OTHER JEWELLERY
147	E2340-2344	ART, ANTIQUES & DECORATIVE WARE
147	E2430-2434	TABLEWARE & FLATWARE
147	R3200-3207	SPORTING EQUIPMENT & ASSOCIATED SERVICES
147	R3208	PLAYGROUNG EQUIPMENT
147	R3210-3212	TOYS
147	R3213	SLEIGHS, TOBOGGANS & CHILDREN'S VEHICULES
147	R3220-3229	GAMES & HOBBY EQUIPMENT
147	R3228-3229	OTHER GAMES & RECREATION EQUIPMENT
147	R3240-3242	MUSICAL INSTRUMENTS
147	R3250	COLLECTOR'S ITEMS
147	R3260-3262	CAMPING & PICNIC EQUIPMENTS
147	R3270	SUPPLIES & PARTS FOR RECREATIONAL EQUIPMENT
147	R3280	BICYCLES
147	R3291	BICYCLE MAINTENANCE & REPAIR
147	R3304	RECORDS, C.D.'S, TAPES
147	R3305	BLANK AUDIO TAPES
147	R3309	BLANK & PRE-RECORDED VIDEO TAPES & DISCS
150	S2030-2049	MATERIALS
150	S2100	MAINTENANCE, REPAIRS & REPLACEMENTS
152	T2950-2965	PUBLIC TRANSPORTATION
153	R3326	CABLE VISION
154	H2200-2204	TELEPHONE
155	H2205	POSTAL AND OTHER COMMUN. SERVICES
156	S2096	ELECTRICITY
156	S2116	ELECTRICITY
157	S2090	WATER
157	S2101	PROPERTY TAXES & SEWAGE CHARGES

TABLE A4-1 (Continued)

I-O	FAMEX CODE	ITEM
157	S2110	WATER & FUEL
160	S2000	RENT
160	S2130	RENTED VACATION HOMES
161	H3060	PUBLIC HOSPITAL & MEDICINAL PLANS
161	H3061-3063	PRIVATE HEALTH CARE PLANS
161	M3600	INTEREST ON PERSONAL LOANS
161	M3601-3602	EXPANSE ON OTHER PROPERTIES
161	R3295	INSURANCE PREMIUMS
161	S2002	TENANT'S INSURANCE PREMIUNS
161	S2070	CODOMINIUM CHARGES
161	S2071	PROPERTY TAXES
161	S2072	HOMEOWNERS INSURANCE PREMIUMS
161	S2073-2074	MORTGAGE INTEREST
161	S2075	COMMISSIONS FOR SALE OF REAL ESTATE
161	S2076	LEGAL FEES RELATED TO ACCOMMODATION
161	S2077	MORTGAGE INSURANCE PREMIUNS
161	S2078-2080	OTHER EXPENSES
161	S2102	INSURANCE PREMIUMS
161	S2103	MORTGAGE INTEREST
161	S2117	OTHER EXPENSES
161	SC3710	LIFE INSURANCE PREMIUMS
161	SC3711	ANNUITY
161	T2916	OPTIONAL INSURANCE CHARGES
161	T2944	PRIVATE & PUBLIC INSURANCE PREMIUMS
162	M3603	LEGAL SERVICES
162	M3611	OTHER MISCELLANIOUS SERVICES
162	M3604	FINANCIAL SERVICES
163	ED3396-3400	TUITION FEES (EX. DRIVING COURSES)
164	H3040-3042	DENTAL CARE
164	H3050-3053	HOSPITAL & OTHER HEALTH CARE SERVICES
165	M3607	GOVERNMENT-RUN POLL & LOTTERY TICKETS
165	M3608	OTHER LOTTERY, POOL & RAFFLE TICKETS
165	R3315	RENTAL OF VIDEOTAPE RECORDINGS
165	R3316	RENTAL OF OTHER HOME ENTERTAINMENT EQUIPMENT
165	R3319	OTHER SERV. RE. HOME ENTERTAINMENT VIDEO
165	R3320	MOTION PICTURE SHOWING
165	R3321-3324	LIVE SPORTS SPECTACLES
165	R3325	LIVE STAGED PERFORMANCES
165	R3340-3349	FEES FOR SINGLE USAGE
165	R3350	ADMISSION TO MUSEUMS, EXHIBITIONS ETC.
166	F1520	FOOD FROM STORES ON TRIPS OVERNIGHT OR LONGER
166	F1550-1566	FOOD PURCHASED FROM RESTAURANTS
165	R3360	TRAVELING FEES INCL. FOOD
166	S2120-2123	TRAVELLER ACCOMODATION
166	S2131	OTHER ACCOMMODATION AWAY FROM HOME
166	TA3511	WINE & CIDER
166	TA3512	
167	C2870-2879	CLOTHING SERVIVES
167	C2876-2878	OTHER MAINTENANCE AND REPAIR OF CLOTHING
167	C2879	OTHER CLOTHING SERVICES
167	E2490-2498	SERVICES RELATED TO FURNISHINGS & EQUIPMENT
167	H2210-2213	CHILD CARE
167	H2220	DOMESTIC AND OTHER CUSTODIAL SERVICES
167	M3605	DUES TO UNIONS & PROFESSIONAL ASSOCIATIONS
167	M3606	CONTRIBUTIONS AND DUES TO SOCIAL CLUBS
167	P3150-3153	PERSONAL CARE SERVICES

TABLE A4-1 (Continued)

I-O	FAMEX CODE	ITEM
167	R3236	OTHER PHOTOGRAPHIC SERVICES
167	R3271	RENTAL, MAINTENANCE & REPAIRS
167	R3293	MAINTENANCE & REPAIR SUPPLIES
167	R3294	MAINTENANCE & REPAIR JOBS
167	R3296	REGISTRATION FEES & LICENCES
167	R3297	RENTAL & LEASING FEES
167	R3298	OTHER EXPANSES
167	R3317	MAINTENANCE & REPAIR JOB
167	R3330-3338	MEMBERSHIP FEES & DUES FOR CLUBS ETC.
167	RE3386	SERVICES: DUPLICATA, LIBRARY, FEES & FINES
167	S2001	TENANT'S MAINTENANCE, REPAIRS & ALTER.
167	S2010-2029	CONTRACT & LABOUR COSTS
167	T2915	RENTAL FEES
167	T2919	RENTAL FEES
167	T2923	LEASING FEES FOR AUTOMOBILES & TRUCKS
167	T2935-2939	MAINTENANCE & REPAIR JOBS
167	T2940-2941	PARKING
167	T2942	DRIVING LESSONS
167	T2943	DRIVER'S LICENCES
167	T2945	REGISTRATION FEES
167	T2946	OTHER OPERATION SERVICES
167	H2234	VETERINARIAN & OTHER SERVICES
170	R3361	TRAVELING FEES
170	R3362	SIGHT SEEING TOURS & EXCURSION PACKAGES
170	R3370	OTHER RECREATION SERVICES

APPENDIX G

LIST OF PROXIES

Table A4-2 Allocation of Proxies to I-O Commodities

I-O Commodity	Description
1-4,8,17,66-9 Farm Products	FAMEX # 3800, 3820, 3830, 3040
24 Fish Landings	I-O #56
34 Horse Meat	I-O #33
77 Cocoa and Chocolate	FAMEX # 1391
88 Maple Sugar & Syrup	I-O #83
95 Soft Drinks Concentrates	I-O #96
98 Alcohol, Natural Ethyl	I-O #97
106 Other Rubber Prod.	I-O #105
107,114-6,138-9 Repair Supplies	I-O #150
109 Yarns & Mand Fab.	I-O #110
119 Newsprint & Other Paper Stock	I-O #121
132 Other Industrial Machinery	I-O #130,133-4
141 Other Petroleum Prod	I-O #140
142 Industrial Chemicals	I-O #145
169 Operating, Office & lab. Supplies	FAMEX 2282
171 Non-Competing Imports	FAMEX 1220-1234
I-O Commodity-Margins	Description
151 Pipeline Transportation	I-O #140,141
152 Transportation and Storage	I-O #71,72
158 Wholesale Margins	FAMEX #1000-3724 (Total Current Consumption)
159 Retail Margins	FAMEX #1000-3724 (Total Current Consumption)
168 Transportation Margins	FAMEX #1000-3724 (Total Current Consumption)
173 Indirect Taxes	FAMEX #1000-3724 (Total Current Consumption)

APPENDIX H

TABLES OF THE EXTENDED USE AND MAKE MATRICES

TABLE A4-3 PERSONAL EXPENDITURE BY HOUSEHOLDS' INCOME GROUPS (EXCL. ENDOGENIZED PRIMARY INPUTS), U MATRIX (MODEL 2) ($ '000)

NO.	COMMODITY TITLE	< $10,000	$10,000-14,999	$15,000-19,999	$20,000-24,999	$25,000-29,999	$30,000-34,999	$35,000-39,999	$40,000-44,999	$45,000-49,999	$50,000-59,999	$59,999 <	TOTAL
1	CATTLE AND CA	5198	13942	7915	10690	12037	9901	9534	9053	7014	8461	16279	110026
2	SHEEP AND LAM	182	489	278	376	423	348	335	318	246	298	572	3865
3	HOGS	1200	3217	1826	2467	2778	2285	2200	2089	1619	1953	3757	25391
4	POULTRY	500	1341	761	1028	1158	952	917	870	675	814	1566	10585
5	OTHER LIVE AN	835	1227	2432	2082	3065	2488	2404	3741	2734	5010	6927	32945
6	WHEAT,UNMILLE	0	0	0	0	0	0	0	0	0	0	0	0
7	BARLEY,OATS,R	0	0	0	0	0	0	0	0	0	0	0	0
8	MILK,WHOLE,FL	803	2153	1222	1651	1858	1529	1472	1398	1083	1307	2514	16989
9	EGGS IN THE S	34332	37304	36501	8244	37369	36721	28982	31065	21557	34280	42012	348366
10	HONEY AND BEE	3065	5321	2594	915	3230	4326	3216	3858	2612	3810	4907	37854
11	NUTS,EDIBLE,N	0	0	0	0	0	0	0	0	0	0	13123	13123
12	FRUITS,FRESH,	52900	53309	55148	12017	61679	68867	50975	66975	39778	72512	110778	644937
13	VEGETABLES,FR	87486	93863	98113	22386	112884	112290	101127	103435	74450	112152	181070	1099255
14	HAY,FORAGE,AN	0	0	0	0	0	0	0	0	0	0	0	0
15	SEEDS EX. OIL	505	991	1133	970	1311	1607	1274	1343	1380	1798	3418	15731
16	NURSERY STOCK	7204	9778	11924	15311	21073	21583	22741	26125	25713	49773	100829	312052
17	OIL SEEDS,NUT	28	76	43	59	66	54	52	49	38	46	88	600
18	HOPS INC. LUP	0	0	0	0	0	0	0	0	0	0	0	0
19	TOBACCO,RAW	0	0	0	0	0	0	0	0	0	0	0	0
20	MINK SKINS,RA	0	0	0	0	0	0	0	0	0	0	0	0
21	WOOL IN GREAS	0	0	0	0	0	0	0	0	0	0	0	0
22	SERV. INCIDEN	11045	13533	12378	10596	7954	10242	17228	11612	14068	29465	92784	230906
23	FORESTRY PROD	30068	34600	32819	28093	35022	42600	28235	34720	20695	33713	61071	381636
24	FISH LANDINGS	4414	4611	5250	1247	5588	6054	5155	5744	4395	6254	11025	59737
25	HUNTING & TRA	0	0	0	0	0	0	0	0	0	0	0	0
26	IRON ORES & C	0	0	0	0	0	0	0	0	0	0	0	0
27	OTHER METAL.	0	0	0	0	0	0	0	0	0	0	0	0
28	COAL	544	955	1083	869	1109	1393	1277	1469	1179	2250	3927	16055
29	CRUDE MINERAL	0	0	0	0	0	0	0	0	0	0	0	0
30	NATURAL GAS	33937	59603	67616	54263	69248	86914	79743	91698	73585	140415	245109	1002130
31	NON-METALLIC	1453	2551	2894	2323	2964	3720	3413	3925	3150	6010	10492	42895
32	SERVICES INCI	0	0	0	0	0	0	0	0	0	0	0	0
33	BEEF,VEAL,MUT	188035	259799	244788	62751	302819	288440	272223	279389	200510	342380	523387	2964519
34	HORSE MEAT PR	107	148	139	35	173	164	155	159	114	195	297	1686
35	MEAT,CURED	41942	58063	53837	12521	61607	70161	54844	61327	36383	60908	82583	594174
36	MEAT PREP. CO	53156	67012	74016	20505	82546	79745	75531	86201	54546	86900	120098	800256
37	MEAT PREP. CA	9716	8763	11422	3522	11583	11580	10197	8010	4272	9108	8756	96928
38	ANIMAL OILS &	0	1731	1160	0	1084	2112	863	1439	0	0	1996	10386
39	MARGARINE,SHO	25576	25465	30809	5932	27738	30555	22094	21058	13974	25480	26924	255602
40	SAUSAGE CASIN	0	0	0	0	0	0	0	0	0	0	0	0
41	PRIMARY TANKA	0	0	0	0	0	0	0	0	0	0	0	0
42	FEEDS OF ANIM	0	0	0	0	0	0	0	0	0	0	0	0

TABLE A4-3 (Continued)

NO.	COMMODITY TITLE	< $10,000	$10,000-14,999	$15,000-19,999	$20,000-24,999	$25,000-29,999	$30,000-34,999	$35,000-39,999	$40,000-44,999	$45,000-49,999	$50,000-59,999	$59,999 <	TOTAL
43	HIDES AND SKI	0	0	0	0	0	0	0	0	0	0	0	0
44	ANIMAL MAT.FO	0	0	0	0	0	0	0	0	0	0	0	0
45	CUSTOM WORK M	0	0	0	0	0	0	0	0	0	0	0	0
46	POULTRY,FRESH	82700	90223	109380	22056	116981	123319	103389	105921	69535	98598	185909	1108011
47	POULTRY,CANNE	1546	1395	1818	560	1844	1843	1624	1275	680	1450	1394	15429
48	MILK,WHOLE,FL	135366	149815	139499	35990	168608	177139	150949	151198	106096	160518	220165	1595342
49	CREAM,FRESH	12088	15104	12079	3909	11945	10989	11100	14269	9659	11480	24196	136817
50	BUTTER	23671	31580	29816	7319	34531	32552	26914	37849	27421	36786	51692	340130
51	CHEESE,CHEDDA	86010	99395	106607	27051	131138	132869	117350	130543	82906	153717	219576	1287160
52	MILK EVAPORAT	10176	10586	6851	1933	8837	6827	6554	3155	2464	3834	4377	65594
53	ICE CREAM	26544	36006	32768	7924	37708	47379	37000	36123	28869	47698	60986	399006
54	OTHER DAIRY P	32801	44160	40831	9072	46398	44577	41007	38468	32890	49477	84270	463951
55	MUSTARD MAYON	18142	16036	17404	4116	18645	20026	19040	20940	13143	21803	30109	199404
56	FISH PRODUCTS	37310	38972	44380	10537	47233	51175	43573	48554	37151	52867	93192	504946
57	FRUIT,BERRIES	45342	51279	52097	13466	60668	64797	57154	60577	41334	71918	100037	618667
58	FRUITS & PREP	23393	26374	27345	7482	29062	30883	26656	28054	22312	24236	41841	287638
59	VEGET.FROZEN,	14984	21784	22252	5297	26499	25813	25245	23172	13724	30641	37889	247298
60	VEGETABLES&PR	36537	43253	43965	9062	56637	51034	47651	42568	30721	45648	65316	472391
61	SOUPS CANNED	17526	19699	19855	5153	20294	21472	19787	18669	12448	18983	28994	202880
62	INFANT&JUNIOR	0	0	9036	2086	10742	8969	4889	7333	0	38612	6782	88449
63	PICKLES,RELIS	26306	28004	29777	7762	46754	47114	35956	38518	26289	44052	57447	387979
64	VINEGAR	2115	2411	2652	421	2477	3016	2343	2220	1335	2434	4276	25700
65	OTHER FOOD PR	43291	42707	46980	9568	53750	54496	47183	44553	33704	53908	89082	519222
66	PRIMARY OR CO	150	403	229	309	348	286	275	262	203	245	471	3180
67	FEED FOR COMM	1006	2697	1531	2068	2329	1915	1844	1752	1357	1637	3149	21285
68	FEEDS, GRAIN	477	1278	725	980	1104	908	874	830	643	776	1493	10088
69	FEEDS OF VEGE	266	713	404	547	615	506	487	463	358	433	832	5623
70	PET FEEDS	14790	20467	28470	25706	32704	32153	33508	28882	31105	55315	94116	397215
71	WHEAT FLOUR	6181	8944	8237	2000	7240	8375	6307	5946	5123	6226	9000	73579
72	CEREAL&FLOUR	1802	2253	2437	560	3068	2603	2522	2758	1600	3034	4373	27010
73	BREAKFAST CER	28103	29704	30798	6966	32070	37037	33972	34229	20852	34836	48950	337515
74	BISCUITS	32553	37110	30617	10258	42099	47586	42390	43964	28687	35913	57924	409098
75	BREAD & ROLLS	92441	97679	94550	21540	104886	103489	88395	90264	55991	94977	127102	971314
76	OTHER BAKERY	48201	59075	62800	16420	78454	77515	73799	80032	62428	87540	141170	787433
77	COCOA & CHOCO	2925	3358	3377	993	3329	3925	3210	4046	3400	4271	5227	38060
78	NUTS,KERNELS	7565	10855	11157	3182	17217	13682	14435	14793	10013	19238	28534	150670
79	CHOCOLATE CON	38759	41858	43169	13702	57790	64148	46031	56725	43466	67632	78700	551979
80	OTHER CONFECT	28777	33646	36839	10023	49855	57457	53134	54801	34444	53004	73704	485682
81	BEET PULP	0	0	0	0	0	0	0	0	0	0	0	0
82	SUGAR	5444	5619	4874	1063	4690	5241	3406	3405	2453	4122	4725	45041
83	MOLASSES,SUGA	249	294	380	55	273	453	283	370	265	408	514	3545
84	OILSEED,MEAL	0	0	0	0	0	0	0	0	0	0	0	0

TABLE A4-3 (Continued)

NO.	COMMODITY TITLE	< $10,000	$10,000-14,999	$15,000-19,999	$20,000-24,999	$25,000-29,999	$30,000-34,999	$35,000-39,999	$40,000-44,999	$45,000-49,999	$50,000-59,999	$59,999 <	TOTAL
85	VEG. OILS & F	0	0	0	0	0	0	0	0	0	0	0	0
86	NITROGEN FUNC	0	0	0	0	0	0	0	0	0	0	0	0
87	MALT,MALT FLO	8285	7765	8401	1855	10916	9969	10054	8694	4413	10729	13569	94649
88	MAPLE SUGAR &	8075	9559	12341	1808	8867	14683	9181	12004	8603	13246	16654	115020
89	PREPARED CAKE	13460	16626	15273	3057	16193	17651	15662	15658	12469	15461	17465	158975
90	SOUPS,DRIED&S	8928	7750	13225	1733	10587	9167	8433	11710	6341	12488	12348	102710
91	COFFEE, ROAST	71386	70272	73096	17873	76361	67981	63643	64840	40071	66406	103369	715300
92	TEA	10886	11455	8745	1986	9164	7762	6982	7615	3973	7049	10785	86403
93	POTATO CHIPS	23643	31722	32522	8822	47509	47038	40944	39696	29807	45318	67121	414142
94	MISC. FOOD NE	77274	87044	97125	20761	107836	107749	101377	86615	65362	108447	145226	1004815
95	SOFTDRINK CON	326	419	451	117	568	601	549	534	384	581	886	5416
96	CARBONATED BE	78827	101469	109048	28330	137141	145378	132529	128890	92949	140344	213919	1308821
97	ALCOHOLIC BEV	11889	26416	34465	35585	34590	35907	40512	43416	40452	71186	130078	504495
98	ALCOHOL, NATU	9	20	26	27	26	27	30	33	30	54	99	385
99	BREWERS'& DIS	0	0	0	0	0	0	0	0	0	0	0	0
100	ALE BEER, STO	73531	110613	118795	149742	187486	175324	206500	169184	160150	281615	358890	1991821
101	WINES	9245	16183	27827	28381	37665	38314	49442	40777	40011	84561	176164	548567
102	TOBACCO PROCE	0	0	0	0	0	0	0	0	0	0	0	0
103	CIGARETTES	49790	74103	97461	88830	116019	110431	121234	97793	75843	133523	178180	1143200
104	TOBACCO MFG E	19078	20741	22081	13577	16487	17369	10239	9212	6816	8945	14925	159471
105	TIRES & TUBES	5342	12915	19794	18310	27388	26604	22303	26008	22742	37048	61723	280174
106	OTHER RUBBER	3969	9597	14709	13606	20351	19769	16572	19326	16899	27530	45865	208192
107	PLASTIC FABRI	3077	7097	13793	11946	14859	19420	23584	20790	18771	36857	69865	240056
108	LEATHER & LEA	39631	67561	92177	100505	135010	133755	138107	147205	138890	232903	470963	1696706
109	YARNS & MAN M	3945	6598	7699	8371	9026	11252	9357	10479	10008	18988	30529	126251
110	FABRICS	11744	19637	22917	24919	26865	33493	27850	31191	29790	56517	90870	375792
111	OTHER TEXTILE	37074	46196	56901	62694	68422	82405	80974	84695	86779	146958	288134	1041231
112	HOSIERY & KNI	49775	74047	100934	116175	152955	159871	171578	179532	168212	301631	641774	2116481
113	CLOTHING & AC	125793	187135	255086	293604	386557	404034	433622	453723	425115	762298	1621925	5348889
114	LUMBER & TIMB	727	1676	3258	2822	3509	4587	5570	4911	4433	8705	16502	56699
115	VENEER AND PL	526	1212	2356	2041	2539	3318	4029	3552	3207	6296	11935	41008
116	OTHER WOOD FA	1632	3763	7315	6335	7880	10299	12507	11025	9955	19545	37050	127306
117	FURNITURE& FI	59970	106430	117156	152610	160385	183128	177236	198670	202266	351402	652642	2361890
118	PULP	0	0	0	0	0	0	0	0	0	0	0	0
119	NEWSPRINT & O	341	480	554	547	683	682	750	748	676	1170	2410	9039
120	PAPER PRODUCT	71776	98976	110161	110639	134043	139233	136624	126815	120193	203378	333504	1585338
121	PRINTING & PU	86358	121498	140277	138792	172965	172802	190166	189554	171363	296331	610749	2290853
122	ADVERTISING,	0	0	0	0	0	0	0	0	0	0	0	0
123	IRON & STEEL	0	0	0	0	0	0	0	0	0	0	0	0
124	ALUMINUM PROD	0	0	0	0	0	0	0	0	0	0	0	0
125	COPPER & COPP	0	0	0	0	0	0	0	0	0	0	0	0

TABLE A4-3 (Continued)

NO.	COMMODITY TITLE	< $10,000	$10,000-14,999	$15,000-19,999	$20,000-24,999	$25,000-29,999	$30,000-34,999	$35,000-39,999	$40,000-44,999	$45,000-49,999	$50,000-59,999	$59,999 <	TOTAL
126	NICKEL PRODUC	0	0	0	0	0	0	0	0	0	0	0	0
127	OTHER NON FER	0	0	0	0	0	0	0	0	0	0	0	0
128	BOILERS, TANK	0	0	0	0	0	0	0	0	0	0	0	0
129	FABRICATED ST	0	0	0	0	0	0	0	0	0	0	0	0
130	OTHER METAL F	8261	25105	45184	42483	64972	57785	59477	65278	56372	83019	115785	623721
131	AGRICULTURAL	3772	3698	13529	10423	11410	8396	5703	14027	9060	26166	23652	129837
132	OTHER INDUSTR	5145	16747	41103	34375	50963	56674	54754	55207	56332	94586	190363	656249
133	MOTOR VEHICLE	83992	276485	712018	582559	873724	979917	939939	952628	977845	1663226	3408158	11450474
134	MOTOR VEHICLE	11618	35114	53818	59444	70282	82336	85731	72640	77158	110201	188053	846397
135	OTHER TRANSPO	0	0	0	3339	5909	36067	6265	11556	5429	50303	309500	428370
136	APPLIANCES &	108347	181899	276931	292186	383324	391079	376642	432826	321848	569566	982407	4317055
137	OTHER ELECTRI	22935	36398	41125	45262	55685	53818	55037	58012	44711	88378	163798	665160
138	CEMENT & CONC	709	1637	3180	2754	3427	4478	5438	4793	4329	8498	16109	55353
139	OTHER NON-MET	6658	15358	29849	25852	32157	42026	51037	44991	40622	79761	151194	519505
140	GASOLINE & FU	118610	239878	320212	310654	413055	455231	454560	434460	393517	685381	1060795	4886334
141	OTHER PETROLE	8250	16684	22272	21607	28730	31664	31617	30219	27371	47672	73784	339871
142	INDUSTRIAL CH	259	370	432	428	536	557	573	527	497	841	1355	6376
143	FERTILIZERS	1852	3630	4428	3317	5335	7360	6221	6558	6403	12625	22767	80494
144	PHARMACEUTICA	62408	111019	96881	109097	110860	110225	91936	110881	91472	145933	240816	1281523
145	OTHER CHEMICA	98917	141235	165222	163271	204924	212879	219161	201530	190088	321318	517501	2436041
146	SCIENTIFIC EQ	20186	29680	45941	68523	103325	111688	106755	112893	121628	180193	432360	1333173
147	OTHER MANUFAC	44193	81084	135120	153059	238936	272434	241872	269723	245555	487192	1096299	3265456
148	RESIDENTIAL C	0	0	0	0	0	0	0	0	0	0	0	0
149	NON-RESIDENTI	0	0	0	0	0	0	0	0	0	0	0	0
150	REPAIR CONSTR	1698	3917	7613	6594	8201	10719	13017	11475	10361	20343	38562	132500
151	PIPELINE TRAN	16008	32376	43218	41928	55749	61442	61351	58638	53113	92505	143174	659506
152	TRANSPORTATIO	287396	359536	368709	413109	510449	382382	528106	442788	355353	782223	1821179	6251230
153	RADIO & TELEV	52951	68245	65937	64721	80504	84170	76241	75525	74935	129053	177203	949485
154	TELEPHONE & T	263729	318659	351298	327153	435358	395264	366548	346640	310830	518814	860153	4494446
155	POSTAL SERVIC	29125	41237	44971	43463	46144	43724	45429	45122	44161	84891	123326	591593
156	ELECTRIC POWE	294095	451813	458315	428438	499063	502336	467327	465804	404541	719897	1208204	5899831
157	OTHER UTILITI	58005	96489	113469	110622	147347	138310	154384	158725	158314	270414	546700	1952779
158	WHOLESALE MAR	401758	578922	717190	578823	912893	959789	925472	944227	802993	1391814	2433434	10647339
159	RETAIL MARGIN	1208265	1696575	2043278	1776907	2658208	2755610	2721143	2780821	2402059	4210180	7725197	31978327
160	IMPUTED RENT	4490755	4805751	4493780	3976490	4296510	3463230	2929526	2254459	1481691	2758940	2690070	37641200
161	OTHER FINANCE	466613	876659	1278559	1408855	2129517	2444366	2658707	3008684	2639322	4446044	8286417	29643744
162	BUSINESS SERV	90052	148959	91670	83511	98899	90957	81711	100275	94213	153483	307896	1341625
163	EDUCATION SER	62895	71136	94561	68321	96163	118434	121207	158046	129403	320946	816013	2057124
164	HEALTH SERVIC	196463	319818	456081	401182	515405	451710	585946	645234	484493	867275	1397357	6320965
165	AMUSEMENT & R	138797	211928	309905	321617	400206	411558	451567	455465	398483	777334	1342055	5218911
166	ACCOMMODATION	792423	879157	1035807	444147	1569837	1715551	1557111	1605423	1420986	2038262	4723989	17782694
167	OTHER PERSONA	294072	497141	605006	663450	847112	897643	950117	1048427	954978	1833669	3684993	12276610

TABLE A4-3 (Continued)

NO.	COMMODITY TITLE	< $10,000	$10,000-14,999	$15,000-19,999	$20,000-24,999	$25,000-29,999	$30,000-34,999	$35,000-39,999	$40,000-44,999	$45,000-49,999	$50,000-59,999	$59,999 <	TOTAL
168	TRANSPORTATIO	89332	124026	150830	105653	189392	200003	192144	195308	165076	285123	503802	2200707
169	OPERATING, OF	37270	60888	55691	66742	75152	88865	80493	74237	74594	121520	244357	979809
170	TRAVEL, ADVER	6840	19696	37947	31827	36207	45871	42473	37185	41539	55124	144530	499240
171	NON-COMPETING	35753	38196	42588	8886	41071	39474	42631	42223	26893	47659	67762	433134
172	UNALLOCATED I	3663	5405	7162	8280	9564	10732	11939	12988	14095	15248	20224	119300
173	INDIRECT TAXE	718359	1108892	1455545	1559549	1900149	2044066	2219655	2260659	2281792	3000091	4397865	22946655
174	SUBSIDIES	0	0	0	0	0	0	0	0	0	0	0	0
178	OTHER OPERATI	10071	29823	41851	44126	45044	45397	44352	43196	40042	70852	336365	751118

TABLE A4-4 INDIVIDUAL WAGES AND SALARIES BY INDUSTRY, U MATRIX (MODEL 2) ($ '000)

	INDUSTRY TITLE	< $10,000	$10,000-14,999	$15,000-19,999	$20,000-24,999	$25,000-29,999	$30,000-34,999	$35,000-39,999	$40,000-44,999	$45,000-49,999	$50,000-59,999	$59,999 <	Total
1	DAIRY FARMS	73121	45604	36361	34665	24785	22951	14376	15566	9379	20453	55558	352819
2	CATTLE FARMS	60751	20191	16099	12145	8683	8041	5037	6526	3932	18455	50131	209990
3	HOG FARMS	15309	8825	7036	6763	4835	5799	3632	5226	3149	11877	32261	104712
4	POULTRY FARMS	5702	5323	4244	5864	4193	5288	3313	5411	3260	23866	64831	131295
5	WHEAT FARMS	67003	25532	20357	10650	7615	6874	4306	4928	2969	5343	14514	170090
6	SMALL GRAIN F	78941	30012	23929	17756	12695	12658	7929	8891	5357	12533	34043	244745
7	FIELD CROPS F	6406	5657	4511	9391	6714	12452	7800	8823	5316	21677	58883	147630
8	FRUIT FARMS	13980	7834	6246	5420	3875	5500	3445	3820	2302	15950	43327	111699
9	VEGETABLE FAR	6141	4513	3598	4026	2878	3723	2332	3364	2027	14400	39117	86120
10	MISCELLANEOUS	15786	8485	6765	7753	5543	7606	4764	6825	4112	65641	178307	311588
11	LIVESTOCK COM	6490	2364	1885	1506	1076	838	525	930	561	3316	9008	28498
12	OTHER COMBINA	8496	3464	2762	2586	1849	1966	1231	1322	797	4159	11297	39928
13	FISH & TRAPPI	48966	29427	24569	28058	22994	22225	12545	12488	5438	11610	13297	231619
14	LOGGING & FOR	162535	123763	146396	169101	179752	199473	157898	131217	83580	98527	102842	1555084
15	MINING	40483	47230	70904	143928	300397	467405	438296	366171	231273	198253	157425	2461766
16	CRUDE PETROLE	24157	30246	51621	87770	101796	137719	144743	147240	126458	227599	595828	1675178
17	QUARRY & SAND	14946	22585	30366	41555	39327	32401	20595	12456	8182	8680	21088	252181
18	SERVICE RELAT	53064	63972	100249	143592	154760	180499	158665	132641	92779	142946	222342	1445507
19	MEAT & MEAT P	43495	58017	113563	180537	178684	98718	52558	34989	19046	20279	39611	839497
20	POULTRY PRODU	12933	17251	33768	53683	53132	29354	15628	10404	5663	6030	11778	249624
21	FISH PRODUCTS	148303	86524	70403	50217	36989	26060	20229	15163	5237	11196	21253	491574
22	FRUIT AND VEG	42494	39177	47329	56805	51109	50007	27799	24595	14126	12448	20294	386184
23	DAIRY PRODUCT	27474	37789	67530	122826	154278	132578	80796	38602	21377	17851	36355	737456
24	FEED INDUSTRY	8150	12242	26493	42744	43842	36024	22783	15181	7633	7310	11509	233912
25	VEGETABLE OIL	730	1396	1698	5183	7866	7938	4456	2521	1923	1072	1671	36454
26	BISCUIT INDUS	10408	13554	24400	29507	27297	21537	12332	4916	3331	2828	6748	156859
27	BREAD & OTHER	34586	45041	81082	98053	90708	71568	40981	16334	11069	9398	22423	521244
28	CANE & BEET S	3928	5377	11139	10345	8630	8352	4709	3728	2089	2589	3889	64773
29	MISC. FOOD PR	67964	81198	128293	163217	162502	152564	99739	76228	36893	51901	89052	1109552
30	SOFT DRINK IN	17302	19918	34553	49979	73866	65406	36326	21355	9879	12609	22080	363271
31	DISTILLERY PR	3060	3850	6928	16688	23702	36175	22128	22522	11361	9770	16145	172329
32	BREWERY PRODU	15618	14903	20188	27880	44608	98878	95929	60699	32927	46425	42129	500185
33	WINE INDUSTRY	2654	2335	3639	3309	5485	7568	4098	2482	647	1479	5682	39378
34	TOBACCO PRODU	7725	4508	9153	18398	46263	57458	32107	31681	15380	15370	29992	268035
35	RUBBER PRODUC	17290	31231	67530	133242	183199	131106	79744	48946	18298	20742	39060	770388
36	PLASTIC INDUS	72980	101990	139145	144102	129548	97057	74163	44719	27277	35373	71520	937873
37	LEATHER INDUS	58378	98483	86282	53439	31125	18147	11654	7641	5904	10643	26605	408301
38	TEXTILE INDUS	106070	171705	254394	240079	153448	118797	74281	46470	22613	36925	93059	1317841
39	CLOTHING INDU	335069	505776	321954	196199	127914	77002	43619	34228	18040	35504	124066	1819372
40	WOOD INDUSTRI	181349	240430	344794	389262	404325	474998	303041	244253	123214	113305	139461	2958430
41	FURNITURE IND	95985	167404	241796	196725	149481	102093	54223	37984	14534	31147	55356	1146729

TABLE A4-4 (Continued)

	INDUSTRY TITLE	< $10,000	$10,000-14,999	$15,000-19,999	$20,000-24,999	$25,000-29,999	$30,000-34,999	$35,000-39,999	$40,000-44,999	$45,000-49,999	$50,000-59,999	$59,999 <	Total
42	PAPER INDUSTR	83629	110738	191459	344211	561987	822565	706737	526447	295068	245776	236021	4124638
43	PUBLISHING &	203533	277389	405331	433418	403671	395002	328688	294340	186984	221901	303643	3453900
44	PRIMARY STEEL	61212	84589	162520	293962	495244	878645	756722	487699	225617	175103	175601	3796913
45	METAL FABRICA	165692	257036	442108	587596	599857	546077	359673	251459	135365	154810	300717	3800391
46	MACHINERY IND	70985	110283	218621	345311	344335	318341	217615	150303	85622	103970	174637	2140023
47	TRANSPORTATIO	190941	302272	531103	765456	1044738	1326384	961741	688461	403241	428510	366288	7009137
48	ELECTRICAL PR	128563	218824	415126	550973	580467	493985	346146	269107	185490	264172	380940	3833792
49	NON-METALLIC	60583	86374	154615	238566	272997	265176	161514	118649	63691	65524	90903	1578593
50	REFINED PETRO	11636	13853	21642	36100	44218	57441	81273	89916	65690	84463	128640	634871
51	CHEMICAL PROD	77563	113710	225121	315332	362956	379434	345162	332188	199628	237944	323591	2912629
52	OTHER MANUFAC	117733	177583	233904	232044	195878	156818	117116	91341	56359	72446	129737	1580959
53	CONSTRUCTION	1491866	1686054	2172796	2491077	2375669	2259918	1708408	1235481	699784	744726	1246487	18112266
54	TRANSPORTATIO	466380	554569	824488	1435347	2044830	1760363	1153545	833824	477271	501925	792397	10844940
55	PIPELINES TRA	5424	4190	7712	15475	18455	28572	33406	38544	27125	36160	57754	272817
56	STORAGE & WAR	17713	24644	41594	63334	61541	58322	43819	22926	13411	15709	22967	385980
57	COMMUNICATION	176890	226927	414350	758189	1109290	1061034	924037	726411	376170	361597	315857	6450753
58	OTHER UTILITY	58087	68765	125500	243493	373829	446193	447727	437055	295804	384911	292150	3173513
59	WHOLESALE TRA	821118	1155070	1844070	2091778	1869164	1621311	1127626	922202	555797	756320	1867063	14631519
60	RETAIL TRADE	3246221	2862019	2883350	2781941	2318339	1726128	999730	701915	379216	494201	1012131	19405190
61	FINANCE & REA	877349	1279443	2414531	1929164	1428998	1255422	977202	925073	615410	953311	2820605	15476508
62	INSURANCE IND	108719	221170	448716	458202	365393	314662	249377	225672	149232	202271	488606	3232020
63	GOVERNT ROYAL	0	0	0	0	0	0	0	0	0	0	0	0
64	OWNER OCCUPIE	0	0	0	0	0	0	0	0	0	0	0	0
65	BUSINESS SERV	768682	925962	1260235	1259814	1049223	968232	769577	693423	520487	772118	1692095	10679847
66	EDUCATIONAL S	33001	31755	53703	67375	77818	91971	101491	104953	66202	48922	33363	710553
67	HEALTH & SOCI	273996	377368	663775	590673	459566	413088	181015	89880	49814	55959	207766	3362899
68	ACCOMMODATION	2562224	1558376	1266172	891648	522229	366505	213713	154549	83042	116982	293006	8028446
69	AMUSEMENT & R	281282	178443	179821	160857	127191	102161	67939	60631	38534	46288	104102	1347249
70	PERSONAL SERV	598374	495166	385702	279078	176275	130821	67413	55253	24096	30675	91938	2334793
71	OTHER SERVICE	468442	434571	501059	438964	330792	265779	172270	134560	81334	119681	219328	3166780
72	SUPPLIES INDU	0	0	0	0	0	0	0	0	0	0	0	0
73	TRAVEL & PROM	0	0	0	0	0	0	0	0	0	0	0	0
74	TRANSPORTATIO	0	0	0	0	0	0	0	0	0	0	0	0
USE SUB-TOTAL		15444058	16082271	21183074	23114329	22686717	21563150	15825436	12381751	7374816	9113854	16802173	181571630
PERSONAL EXPENDITU													
75A	< $10,000	549364	121412	73500	48565	25613	14304	13699	6751	4381	3496	23321	884405
75B	$10,000-$14,99	116843	47799	702	428	364	315	0	90	0	0	0	166540
75C	$15,000-$19,99	93163	59772	111866	1283	723	376	0	0	0	0	0	267184

TABLE A4-4 (Continued)

INDUSTRY TITLE	< $10,000	$10,000-14,999	$15,000-19,999	$20,000-24,999	$25,000-29,999	$30,000-34,999	$35,000-39,999	$40,000-44,999	$45,000-49,999	$50,000-59,999	$59,999 <	Total
75D $20,000-$24,99	93300	53884	88818	183113	1986	791	292	270	202	0	0	422657
75E $25,000-$29,99	88588	51660	74146	116723	215499	2496	1324	938	193	112	0	551681
75F $30,000-$34,99	85693	55400	82423	91345	131500	244231	3605	1296	439	304	0	696236
75G $35,000-$39,99	81143	51503	91222	93577	99570	134614	231878	3769	481	0	0	787757
75H $40,000-$44,99	73742	49019	85670	109322	95890	100780	149306	222039	2819	555	94	889238
75I $45,000-$49,99	59286	45098	78126	104655	98366	99369	101327	135621	128730	1854	242	852674
75J $50,000-$59,99	70479	61534	112767	162520	196548	190057	178985	171393	139376	162373	1551	1447584
75K > $59,999	113205	87037	152390	217802	277673	384006	426248	454692	329755	372443	437737	3252990
FINAL DEMAND CATEG												
122 GCE HOSPITAL E	879482	1211546	2130728	1896074	1475127	1325726	580832	288249	159161	179312	666120	10792358
123 GCE EDUCATION	744483	716420	1211448	1519997	1755417	2074699	2289298	2367173	1492927	1102818	752081	16026762
124 GCE DEFENCE EX	195905	164320	323285	505942	540257	520618	461556	356548	202563	242432	183274	3696700
125 GCE OTHER MUNI	409463	343446	675700	1057474	1129196	1088147	964702	745225	423379	506709	383062	7726504
126 GCE OTHER PROV	508845	426804	839701	1314136	1403266	1352254	1198847	926100	526138	629694	476035	9601819
127 GCE OTHER FEDE	431949	362306	712806	1115545	1191206	1147902	1017678	786148	446629	534535	404097	8150800
128 DOMESTIC EXPOR	8283	8547	11987	13518	13450	12980	9995	8045	4816	5446	8495	105561
TOTAL	20047274	19999777	28040361	31666349	31338369	30256817	23455007	18856099	11236807	12855935	20136282	247891072

TABLE A4-5 INDIVIDUAL WAGES AND SALARIES BY HOUSEHOLD INCOME GROUPS, V MATRIX (MODEL 2) ($ '000)

WAGES AND SALARIES	< $10,000	$10,000-14,999	$15,000-19,999	$20,000-24,999	$25,000-29,999	$30,000-34,999	$35,000-39,999	$40,000-44,999	$45,000-49,999	$50,000-59,999	$59,999 <	Total
175A < $10,000	1826935	49750	35483	22870	15718	10832	8896	7323	2800	5707	15052	2001367
175B $10,000-$14,999	1771623	2143045	30870	13592	9879	6810	3848	1808	0	1153	1580	3984208
175C $15,000-$19,999	1933555	1921476	3948452	37810	22512	10092	5312	2279	748	1989	1462	7885685
175D $20,000-$24,999	1899493	2034586	2858827	5575893	54414	20680	6255	7236	2025	0	2582	12461992
175E $25,000-$29,999	1862348	2116239	2679316	3718249	6296230	64330	21555	12902	3304	2895	1988	16779356
175F $30,000-$34,999	1786799	2041421	2974623	3111896	4198279	7007139	70081	23285	6929	5748	2798	21228999
175G $35,000-$39,999	1669106	1860636	3057288	3184419	3217033	4136955	5676188	64681	14788	7525	3137	22891755
175H $40,000-$44,999	1445710	1669153	2616064	3399720	3183948	3113495	3400048	4816594	46031	14199	7621	23712582
175I $45,000-$49,999	1228829	1373367	2256825	2846959	2991571	2971171	2459688	2744455	2764031	44271	10350	21691516
175J $50,000-$59,999	1757997	1963474	3201935	4183935	4978789	5177097	4382345	3671002	2805664	4435659	51867	36609765
175K > $59,999	2864879	2826630	4380679	5571006	6369996	7738216	7420790	7504533	5590488	8336791	20039845	78643854
TOTAL	20047274	19999777	28040361	31666349	31338369	30256817	23455007	18856099	11236807	12855935	20138282	247891072

TABLE A4-6 INDIVIDUAL NET INCOME OF UNINCORPORATED BUSINESSES (NIUB) BY INDUSTRY, U MATRIX (MODEL 2) ($ '000)

	INDUSTRY TITLE	< $10,000	$10,000-14,999	$15,000-19,999	$20,000-24,999	$25,000-29,999	$30,000-34,999	$35,000-39,999	$40,000-44,999	$45,000-49,999	$50,000-59,999	$59,999 <	Total
1	DAIRY FARMS	39954	131896	108549	124017	91200	79158	59482	54872	39714	83886	306527	1119254
2	CATTLE FARMS	-52133	77324	63637	58275	42855	36749	27614	27567	19952	36453	133202	471494
3	HOG FARMS	-14703	31505	25929	27882	20504	17938	13479	10093	7305	20278	74098	234307
4	POULTRY FARMS	-5119	7622	6273	10727	7888	8686	6527	7463	5402	11333	41411	108213
5	WHEAT FARMS	-19245	101499	83533	112592	82799	80562	60537	58349	42231	63092	230545	896494
6	SMALL GRAIN F	-84287	115867	95357	105105	77293	72224	54271	52745	38175	69665	254562	850977
7	FIELD CROPS F	-15347	11866	9765	13536	9954	7233	5435	4252	3078	11784	43060	104617
8	FRUIT FARMS	-6654	8556	7041	7254	5335	6220	4674	4329	3133	5619	20531	66036
9	VEGETABLE FAR	1199	7088	5834	5086	3740	3226	2424	4227	3059	4726	17271	57880
10	MISCELLANEOUS	-11563	12437	10236	10129	7449	6558	4928	4687	3392	6473	23655	78379
11	LIVESTOCK COM	-4014	12012	9886	10701	7869	4573	3437	3552	2570	5968	21808	78362
12	OTHER COMBINA	-4482	9442	7770	8318	6117	3619	2719	3480	2519	5034	18394	62930
13	FISH & TRAPPI	81782	64740	57326	53818	48477	41800	27684	28464	14804	25111	64954	508959
14	LOGGING & FOR	14243	29299	23797	24339	17960	15244	16904	9293	5791	15766	63163	235800
15	MINING	-246	135	139	166	142	168	42	63	40	78	125	853
16	CRUDE PETROLE	-22381	5682	4377	8434	6543	5916	2249	4643	3619	9089	17867	46039
17	QUARRY & SAND	-45	288	340	269	191	361	209	0	206	236	949	3004
18	SERVICE RELAT	-672	961	850	950	1227	633	694	564	502	1210	2588	9505
19	MEAT & MEAT P	-25	348	451	328	237	125	195	82	0	209	178	2128
20	POULTRY PRODU	0	0	0	0	0	0	0	0	0	0	0	0
21	FISH PRODUCTS	387	308	176	275	197	127	0	0	0	0	305	1774
22	FRUIT AND VEG	-109	82	59	88	81	38	0	0	0	0	0	239
23	DAIRY PRODUCT	4	129	203	193	174	79	104	53	0	29	118	1087
24	[illegible]D INDUSTRY	-83	73	58	55	13	28	0	0	0	0	265	409
25	VEGETABLE OIL	-1000	0	0	0	0	0	0	0	0	0	0	-1000
26	BISCUIT INDUS	11	23	26	22	12	9	4	5	6	6	15	138
27	BREAD & OTHER	153	314	361	310	160	118	61	71	78	88	203	1917
28	CANE & BEET S	0	0	0	0	0	0	0	0	0	0	0	0
29	MISC. FOOD PR	84	165	146	137	137	172	83	95	0	72	421	1512
30	SOFT DRINK IN	1	2	2	1	0	2	0	0	0	0	4	11
31	DISTILLERY PR	0	0	0	0	0	0	0	0	0	0	0	0
32	BREWERY PRODU	0	0	0	0	0	0	0	0	0	0	0	0
33	WINE INDUSTRY	0	0	0	0	0	0	0	0	0	0	0	0
34	TOBACCO PRODU	0	0	0	0	0	0	0	0	0	0	0	0
35	RUBBER PRODUC	5	42	32	35	33	28	0	0	0	0	0	176
36	PLASTIC INDUS	2	189	241	240	209	159	0	0	103	150	491	1784
37	LEATHER INDUS	363	343	188	201	231	230	0	121	0	323	639	2639
38	TEXTILE INDUS	395	461	591	378	276	204	159	59	130	0	358	3009
39	CLOTHING INDU	3064	2916	2085	1977	794	815	1035	940	450	823	2469	17367
40	WOOD INDUSTRI	209	6637	7347	6179	4199	3368	1764	2418	1370	2257	10222	45969
41	FURNITURE IND	1350	1820	1869	1271	1131	993	755	622	207	348	980	11347

TABLE A4-6 (Continued)

	INDUSTRY TITLE	< $10,000	$10,000-14,999	$15,000-19,999	$20,000-24,999	$25,000-29,999	$30,000-34,999	$35,000-39,999	$40,000-44,999	$45,000-49,999	$50,000-59,999	$59,999 <	Total
42	PAPER INDUSTR	-71	101	112	175	157	152	103	47	0	60	164	1000
43	PUBLISHING &	1425	3592	3214	3728	2315	2272	1322	1561	417	1511	6047	27403
44	PRIMARY STEEL	-262	431	642	574	680	665	545	340	88	525	341	4569
45	METAL FABRICA	799	3729	3843	5189	3580	3586	2986	2208	725	1769	6394	34809
46	MACHINERY IND	-67	365	502	498	457	151	226	230	97	113	1146	3718
47	TRANSPORTATIO	-83	436	447	548	410	385	284	216	138	97	614	3492
48	ELECTRICAL PR	-1175	2240	2883	3245	3662	1612	606	1285	777	542	4973	20650
49	NON-METALLIC	282	856	679	483	733	305	348	133	99	166	684	4768
50	REFINED PETRO	-1821	597	998	326	748	682	791	645	0	1142	1146	5256
51	CHEMICAL PROD	-336	254	238	272	146	231	129	58	0	94	681	1767
52	OTHER MANUFAC	1383	2808	2680	2334	2364	2233	1405	1142	1100	1584	5429	24462
53	CONSTRUCTION	121699	332351	378893	421807	334599	286528	163884	144238	71439	133338	432222	2820998
54	TRANSPORTATIO	24625	79107	90159	95236	78847	62363	42258	32111	21782	45034	198216	769739
55	PIPELINES TRA	0	0	0	0	0	0	0	0	0	0	0	0
56	STORAGE & WAR	24	-9	-10	-8	-8	-7	0	0	0	0	-15	-34
57	COMMUNICATION	2612	5624	5105	5370	4294	3289	1473	1556	689	796	5017	35826
58	OTHER UTILITY	-853	1895	1477	1643	1827	1343	1082	1060	1113	961	1577	13124
59	WHOLESALE TRA	-4885	44941	47951	55201	43022	43650	26706	26428	13517	24508	95897	416936
60	RETAIL TRADE	151910	275301	272737	248889	178850	135881	93888	79742	41880	72685	259170	1810932
61	FINANCE & REA	-53451	138315	131588	137710	124874	127662	107640	101471	70050	119884	643452	1649194
62	INSURANCE IND	0	0	0	0	0	0	0	0	0	0	0	0
63	GOVERNT ROYAL	0	0	0	0	0	0	0	0	0	0	0	0
64	OWNER OCCUPIE	329511	469813	555047	467465	678820	785677	801510	859666	825741	1488754	2933759	10195763
65	BUSINESS SERV	48488	80851	92101	109334	108731	128353	105723	127623	90726	211268	1376993	2480191
66	EDUCATIONAL S	15086	17921	17169	13459	11825	9772	5908	4303	2852	6683	18479	123458
67	HEALTH & SOCI	50011	79278	89309	92186	89586	96064	94864	123486	100745	259579	4063280	5138388
68	ACCOMMODATION	59931	102851	99988	92181	60676	47370	28870	30337	10544	31337	124475	688559
69	AMUSEMENT & R	43168	40604	37194	33706	24138	19158	13326	12745	8730	13303	45486	291559
70	PERSONAL SERV	188996	186028	167262	131994	74770	56883	33867	22404	15039	29659	69867	976770
71	OTHER SERVICE	51964	66169	61877	59586	42205	34413	25925	22417	11872	18916	86293	481637
72	SUPPLIES INDU	0	0	0	0	0	0	0	0	0	0	0	0
73	TRAVEL & PROM	0	0	0	0	0	0	0	0	0	0	0	0
74	TRANSPORTATIO	0	0	0	0	0	0	0	0	0	0	0	0
	SUB-TOTAL U MATRIX	930006	2578522	2598558	2576421	2317730	2248039	1853138	1880554	1487997	2844414	11733163	33048543
	PERSONAL EXPENDITU												
75A	< $10,000	0	0	0	0	0	0	0	0	0	0	0	0
75B	$10,000-$14,99	0	0	0	0	0	0	0	0	0	0	0	0
75C	$15,000-$19,99	0	0	0	0	0	0	0	0	0	0	0	0

TABLE A4-6 (Continued)

INDUSTRY TITLE	< $10,000	$10,000-14,999	$15,000-19,999	$20,000-24,999	$25,000-29,999	$30,000-34,999	$35,000-39,999	$40,000-44,999	$45,000-49,999	$50,000-59,999	$59,999 <	Total
75D $20,000-$24,99	0	0	0	0	0	0	0	0	0	0	0	0
75E $25,000-$29,99	0	0	0	0	0	0	0	0	0	0	0	0
75F $30,000-$34,99	0	0	0	0	0	0	0	0	0	0	0	0
75G $35,000-$39,99	0	0	0	0	0	0	0	0	0	0	0	0
75H $40,000-$44,99	0	0	0	0	0	0	0	0	0	0	0	0
75I $45,000-$49,99	0	0	0	0	0	0	0	0	0	0	0	0
75J $50,000-$59,99	0	0	0	0	0	0	0	0	0	0	0	0
75K > $59,999	0	0	0	0	0	0	0	0	0	0	0	0
122 GCE HOSPITAL E	0	0	0	0	0	0	0	0	0	0	0	0
123 GCE EDUCATION	0	0	0	0	0	0	0	0	0	0	0	0
124 GCE DEFENCE EX	0	0	0	0	0	0	0	0	0	0	0	0
125 GCE OTHER MUNI	0	0	0	0	0	0	0	0	0	0	0	0
126 GCE OTHER PROV	0	0	0	0	0	0	0	0	0	0	0	0
127 GCE OTHER FEDE	0	0	0	0	0	0	0	0	0	0	0	0
128 DOMESTIC EXPOR	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	930006	2578522	2598558	2576421	2317730	2248039	1853138	1880554	1487997	2844414	11733163	33048543

TABLE A4-7 NET INCOME OF UNINCORPORATED BUSINESSES (NIUB) BY HOUSEHOLD INCOME GROUPS, V MATRIX (MODEL 2) ($ '000)

	NIUB	< $10,000	$10,000-14,999	$15,000-19,999	$20,000-24,999	$25,000-29,999	$30,000-34,999	$35,000-39,999	$40,000-44,999	$45,000-49,999	$50,000-59,999	$59,999 <	Total
177A	< $10,000	-516826	7594	3138	1345	1308	987	0	1036	0	0	14051	-706665
177B	$10,000-$14,999	200572	329530	2033	0	0	0	0	0	0	0	3695	687901
177C	$15,000-$19,999	230606	311836	362267	1935	0	0	0	0	0	0	0	1122609
177D	$20,000-$24,999	196729	334577	311212	382551	1272	0	0	1008	0	0	0	1481087
177E	$25,000-$29,999	165563	307774	312674	319797	378328	1885	1229	0	0	0	2662	1713113
177F	$30,000-$34,999	128873	263141	301670	299675	267187	416190	2992	1503	0	1397	0	1838532
177G	$35,000-$39,999	122280	202954	276437	271074	274471	250120	318035	2022	2094	0	0	1802472
177H	$40,000-$44,999	93008	163207	218466	264147	229802	241625	211428	359813	2000	2165	4246	1778792
177I	$45,000-$49,999	74728	132435	177019	199335	198901	232288	201715	208640	247707	5103	4246	1589428
177J	$50,000-$59,999	103003	186315	238799	306908	368735	358763	349900	361957	295347	696914	18955	2914044
177K	> $59,999	131471	339157	394843	529653	597726	746181	767838	944576	940849	2138836	11685308	18827231
TOTAL		930006	2578522	2598558	2576421	2317730	2248039	1853138	1880554	1487997	2844414	11733163	33048543

TABLE A4-8 SUPPLEMENTARY LABOUT INCOME (SLI) BY INDUSTRY, U MATRIX (MODEL

	INDUSTRY TITLE	PENSIONS	UIC	C/QPP	WCB	WELFARE	TOTAL
1	DAIRY FARMS	149	2530	1549	7530	2300	14058
2	CATTLE FARMS	95	1614	988	4805	1468	8971
3	HOG FARMS	42	707	433	2105	643	3930
4	POULTRY FARMS	47	796	488	2370	724	4425
5	WHEAT FARMS	72	1230	753	3661	1118	6835
6	SMALL GRAIN FARMS	100	1697	1039	5053	1544	9432
7	FIELD CROPS FARMS	55	932	570	2773	847	5177
8	FRUIT FARMS	53	905	554	2694	823	5030
9	VEGETABLE FARMS	12	210	129	625	191	1168
10	MISCELLANEOUS SPECIAL	123	2092	1281	6229	1903	11629
11	LIVESTOCK COMBINATION	36	608	372	1809	553	3378
12	OTHER COMBINATION FAR	18	305	187	909	278	1697
13	FISH & TRAPPING INDUS	47	1734	1055	11440	994	15270
14	LOGGING & FORESTRY IN	20881	27164	15248	92251	57707	213250
15	MINING	66581	50581	27601	95502	90237	330501
16	CRUDE PETROLEUM & NAT	36039	27379	14940	51694	48844	178897
17	QUARRY & SAND PIT IND	4910	3730	2036	7043	6655	24375
18	SERVICE RELATED TO MI	28831	21903	11952	41355	39075	143115
19	MEAT & MEAT PRODUCTS	15486	17506	9746	18368	40104	101211
20	POULTRY PRODUCTS	3946	4460	2483	4680	10218	25788
21	FISH PRODUCTS INDUSTR	6640	7506	4179	7876	17196	43397
22	FRUIT AND VEGETABLE I	7072	7994	4450	8388	18314	46218
23	DAIRY PRODUCTS INDUST	12853	14530	8089	15245	33286	84004
24	FEED INDUSTRY	4497	5083	2830	5333	11644	29387
25	VEGETABLE OIL MILLS (	626	708	394	743	1622	4094
26	BISCUIT INDUSTRY	2725	3081	1715	3233	7058	17812
27	BREAD & OTHER BAKERY	8687	9820	5467	10303	22495	56771
28	CANE & BEET SUGAR IND	1196	1352	753	1419	3098	7818
29	MISC. FOOD PRODUCTS I	18083	20442	11380	21449	46830	118184
30	SOFT DRINK INDUSTRY	7142	8073	4494	8471	18495	46676
31	DISTILLERY PRODUCTS I	3599	4069	2265	4269	9321	23522
32	BREWERY PRODUCTS INDU	10285	11627	6473	12199	26635	67219
33	WINE INDUSTRY	798	902	502	946	2066	5215
34	TOBACCO PRODUCTS INDU	4203	4751	2645	4985	10884	27469
35	RUBBER PRODUCTS INDUS	25959	29345	16336	30790	67225	169655
36	PLASTIC INDUSTRIES	14585	16487	9178	17299	37770	95319
37	LEATHER INDUSTRIES	5274	5962	3319	6255	13658	34468
38	TEXTILE INDUSTRIES	22255	25158	14005	26397	57633	145448
39	CLOTHING INDUSTRIES	19451	21988	12241	23070	50371	127120
40	WOOD INDUSTRIES	53843	60866	33884	63863	139435	351891
41	FURNITURE INDUSTRIES	15266	17257	9607	18107	39534	99772
42	PAPER INDUSTRIES	86167	97406	54226	102202	223143	563143
43	PUBLISHING & PRINTING	44050	49796	27721	52247	114075	287889
44	PRIMARY STEEL INDUSTR	114899	129886	72307	136282	297551	750925
45	METAL FABRICATING IND	67184	75947	42280	79686	173984	439080
46	MACHINERY INDUSTRIES	42959	48562	27034	50953	111249	280757
47	TRANSPORTATION EQUIPM	171404	193761	107867	203302	443880	1120212
48	ELECTRICAL PRODUCTS I	72081	81483	45362	85495	186667	471088
49	NON-METALLIC MINERAL	27139	30678	17079	32189	70280	177365
50	REFINED PETROLEUM & C	21484	24287	13520	25483	55638	140412
51	CHEMICAL PRODUCTS IND	47968	54224	30187	56894	124220	313493
52	OTHER MANUFACTURED PR	22631	25583	14242	26843	58608	147908
53	CONSTRUCTION INDUSTRI	132823	332506	173501	752289	391629	1782747
54	TRANSPORTATION INDUST	409636	209644	117535	161961	390167	1288943
55	PIPELINES TRANSPORTAT	11307	5787	3244	4471	10770	35578
56	STORAGE & WAREHOUSING	9732	4981	2792	3848	9269	30623
57	COMMUNICATION INDUSTR	269807	138083	77415	106677	256986	848968
58	OTHER UTILITY INDUSTR	137429	70335	39432	54336	130898	432431
59	WHOLESALE TRADE INDUS	145143	450060	251067	156689	444882	1447841
60	RETAIL TRADE INDUSTRI	147913	458648	255857	159678	453372	1475468
61	FINANCE & REAL ESTATE	269572	289574	164924	11119	369705	1104894

TABLE A4-8 (Continued)

	INDUSTRY TITLE	PENSIONS	UIC	C/QPP	WCB	WELFARE	TOTAL
62	INSURANCE INDUSTRIES	51551	55376	31539	2126	70699	211291
63	GOVERNT ROYALTIES ON	0	0	0	0	0	0
64	OWNER OCCUPIED DWELLI	0	0	0	0	0	0
65	BUSINESS SERVICES	93676	276460	158245	77120	208628	814129
66	EDUCATIONAL SERVICE I	25524	7414	4126	471	9372	46907
67	HEALTH & SOCIAL SERVI	73869	48860	25438	3341	51522	203030
68	ACCOMMODATION SERVICE	60377	178187	101994	49706	134468	524732
69	AMUSEMENT & RECREATIO	9883	29167	16695	8136	22011	85892
70	PERSONAL SERVICES	16774	49506	28337	13810	37359	145786
71	OTHER SERVICES	29324	86543	49537	24142	65309	254855
72	SUPPLIES INDUSTRIES	0	0	0	0	0	0
73	TRAVEL & PROMOTION IN	0	0	0	0	0	0
74	TRANSPORTATION MARGIN	0	0	0	0	0	0
SUB-TOTAL USE		3034866	3947827	2201112	3095036	5857141	18135982
PERSONAL EXPENDITURE							
75A	< $10,000	29398	16501	9487	659	15454	71500
75B	$10,000-14,999	5536	3107	1787	124	2910	13464
75C	$15,000-19,999	8881	4985	2866	199	4669	21600
75D	$20,000-24,999	14049	7886	4534	315	7386	34170
75E	$25,000-29,999	18338	10293	5918	411	9640	44601
75F	$30,000-34,999	23143	12990	7469	519	12166	56287
75G	$35,000-39,999	26186	14698	8451	587	13765	63686
75H	$40,000-44,999	29559	16591	9539	662	15539	71890
75I	$45,000-49,999	28344	15909	9147	635	14900	68934
75J	$50,000-59,999	48119	27008	15529	1078	25296	117030
75K	> $59,999	108132	60693	34896	2423	56844	262988
FINAL DEMAND							
122	GCE HOSPITAL EXP.	407724	269683	140405	18441	284379	1120631
123	GCE EDUCATION EXP.	1354172	393346	218920	25008	497209	2488655
124	GCE DEFENSE EXP.	288715	87341	48298	25186	75735	525275
125	GCE OTHER MUNICIPAL GO	674093	164267	93034	153449	231004	1315847
126	GCE OTHER PROVINCIAL G	663079	219184	122916	70073	275596	1350848
127	GCE OTHER FEDERAL GOVE	605940	181150	100165	52860	158948	1099062
128	DOMESTIC EXPORTS	975	750	417	458	1050	3650
TOTAL		7369249	5454209	3034889	3448123	7559630	26866100

TABLE A4-9 SUPPLEMENTARY LABOUR INCOME BY HOUSEHOLD INCOME GROUPS, V MATRIX (MODEL 2) ($ '000)

SLI ITEMS	< $10,000	$10,000-14,999	$15,000-19,999	$20,000-24,999	$25,000-29,999	$30,000-34,999	$35,000-39,999	$40,000-44,999	$45,000-49,999	$50,000-59,999	$59,999 <	Total
PENSIONS	130395	405560	703537	754048	728907	663602	579068	526701	440711	702808	1733914	7369249
UIC	309775	463791	585421	623741	608837	573741	505614	423162	340291	457550	562285	5454209
C/QPP	565349	590990	540844	300142	221129	168852	133632	106219	84622	119250	203859	3034889
WCB	805939	597540	457620	332596	255714	207738	171510	137854	108429	152221	220963	3448123
WELFARE	133763	416037	721713	773528	747738	680745	594027	540309	452097	720964	1778709	7559630
TOTAL	1945221	2473918	3009135	2784054	2562326	2294678	1983851	1734245	1426150	2152793	4499729	26866100

TABLE A4-10 INVESTMENT INCOME BY INDUSTRY, U MATRIX (MODEL 2) ($ '000)

	INDUSTRY TITLE	INVESTMENT INCOME
1	DAIRY FARMS	354
2	CATTLE FARMS	196
3	HOG FARMS	297
4	POULTRY FARMS	253
5	WHEAT FARMS	237
6	SMALL GRAIN FARMS	279
7	FIELD CROPS FARMS	78
8	FRUIT FARMS	14
9	VEGETABLE FARMS	20
10	MISCELLANEOUS SPECIA	246
11	LIVESTOCK COMBINATIO	104
12	OTHER COMBINATION FA	6
13	FISH & TRAPPING INDU	93
14	LOGGING & FORESTRY I	285
15	MINING	1052
16	CRUDE PETROLEUM & NA	3265
17	QUARRY & SAND PIT IN	154
18	SERVICE RELATED TO M	149
19	MEAT & MEAT PRODUCTS	155
20	POULTRY PRODUCTS	48
21	FISH PRODUCTS INDUST	128
22	FRUIT AND VEGETABLE	224
23	DAIRY PRODUCTS INDUS	317
24	FEED INDUSTRY	95
25	VEGETABLE OIL MILLS	25
26	BISCUIT INDUSTRY	58
27	BREAD & OTHER BAKERY	116
28	CANE & BEET SUGAR IN	27
29	MISC. FOOD PRODUCTS	545
30	SOFT DRINK INDUSTRY	142
31	DISTILLERY PRODUCTS	59
32	BREWERY PRODUCTS IND	244
33	WINE INDUSTRY	15
34	TOBACCO PRODUCTS IND	140
35	RUBBER PRODUCTS INDU	25
36	PLASTIC INDUSTRIES	257
37	LEATHER INDUSTRIES	44
38	TEXTILE INDUSTRIES	322
39	CLOTHING INDUSTRIES	269
40	WOOD INDUSTRIES	533
41	FURNITURE INDUSTRIES	200
42	PAPER INDUSTRIES	1201
43	PUBLISHING & PRINTIN	703
44	PRIMARY STEEL INDUST	656
45	METAL FABRICATING IN	781
46	MACHINERY INDUSTRIES	470
47	TRANSPORTATION EQUIP	1107
48	ELECTRICAL PRODUCTS	898
49	NON-METALLIC MINERAL	510
50	REFINED PETROLEUM &	397
51	CHEMICAL PRODUCTS IN	1316
52	OTHER MANUFACTURED P	159
53	CONSTRUCTION INDUSTR	2247
54	TRANSPORTATION INDUS	1964
55	PIPELINES TRANSPORTA	762
56	STORAGE & WAREHOUSIN	89
57	COMMUNICATION INDUST	2503
58	OTHER UTILITY INDUST	4831
59	WHOLESALE TRADE INDU	2799
60	RETAIL TRADE INDUSTR	2328
61	FINANCE & REAL ESTAT	6298

TABLE A4-10 (Continued)

	INDUSTRY TITLE	INVESTMENT INCOME
62	INSURANCE INDUSTRIES	-233
63	GOVERNT ROYALTIES ON	0
64	OWNER OCCUPIED DWELL	7874
65	BUSINESS SERVICES	1019
66	EDUCATIONAL SERVICE	8
67	HEALTH & SOCIAL SERV	291
68	ACCOMMODATION SERVIC	1006
69	AMUSEMENT & RECREATI	988
70	PERSONAL SERVICES	228
71	OTHER SERVICES	649
72	SUPPLIES INDUSTRIES	0
73	TRAVEL & PROMOTION I	0
74	TRANSPORTATION MARGI	0
USE SUB-TOTAL		54921
PERSONAL EXPENDITURE		
75A	< $10,000	4
75B	$10000-$14999	12
75C	$15000-$19999	18
75D	$20000-$24999	18
75E	$25000-$29999	19
75F	$30000-$34999	19
75G	$35000-$39999	19
75H	$40000-$44999	18
75I	$45000-$49999	17
75J	$50000-$59999	30
75K	> $59999	141
FINAL DEMAND CATEGORIES		
122	GCE HOSPITAL EXP.	0
123	GCE EDUCATION EXP.	0
124	GCE DEFENCE EXP.	0
125	GCE OTHER MUNICIPAL G	0
126	GCE OTHER PROVINCIAL	0
127	GCE OTHER FEDERAL GOV	0
128	DOMESTIC EXPORTS	0
TOTAL		55235

TABLE A4-11 INVESTMENT INCOME BY HOUSEHOLD INCOME GROUPS, V MATRIX (MODEL 2) ($ '000)

COMMODITY TITLE	< $10,000	$10,000-14,999	$15,000-19,999	$20,000-24,999	$25,000-29,999	$30,000-34,999	$35,000-39,999	$40,000-44,999	$45,000-49,999	$50,000-59,999	$59,999 <	Total
178A INVESTMENT INCOME	741	2193	3078	3245	3312	3338	3262	3177	2945	5210	24735	55235

TABLE A4-12 GOVERNMENT TRANSFERS BY HOUSEHOLD INCOME GROUPS, V MATRIX (MODEL 2) ($ '000)

GOVERNMENT TRANSFERS	< $10,000	$10,000-14,999	$15,000-19,999	$20,000-24,999	$25,000-29,999	$30,000-34,999	$35,000-39,999	$40,000-44,999	$45,000-49,999	$50,000-59,999	$59,999 <	Total
180A TRANSFER (CANADA/QU	1383	1445	1323	734	541	413	327	260	207	292	499	7422
180B TRANSFER (FED - UNE	590	884	1116	1189	1160	1093	964	806	648	872	1072	10394
180C TRANSFER (FED - FAM	255	196	211	250	287	297	246	196	142	189	254	2524
180D TRANSFER (FED - OLD	233	724	1255	1345	1300	1184	1033	940	786	1254	3094	13148
180E TRANSFER (FED - GRA	327	242	185	135	104	84	69	56	44	62	90	1397
180F TRANSFER (FED - M.S	101	315	547	586	567	516	450	409	343	546	1348	5728
180G TRANSFER (PROV - SO	1197	887	680	494	380	308	255	205	161	226	328	5120
180H TRANSFER (PROV - WO	625	464	355	258	198	161	133	107	84	118	171	2675
180I TRANSFER (PROV - MO	173	175	163	101	83	70	56	44	34	47	76	1022
180J TRANSFER (PROV - MI	2618	1941	1487	1081	831	675	557	448	352	495	718	11202
180K TRANSFER (LOCAL)	225	167	128	93	71	58	48	39	30	43	62	964
TOTAL	7727	7440	7449	6266	5522	4860	4138	3509	2833	4143	7710	61596

APPENDIX I

FINAL DEMAND VECTORS IN SELECTED INDUSTRIES

Table A5-1 **Final Demand Vector: Bundle of Agricultural Commodities of $1 Million Worth**

	Commodity Name	Purchasers' Prices ($)	Producers' Prices ($)
1	CATTLE AND CALVES	24147	23586
2	SHEEP AND LAMBS	204	194
3	HOGS	17179	16582
4	POULTRY	255	240
5	OTHER LIVE ANIMALS	3600	2938
6	WHEAT,UNMILLED	507079	396396
7	BARLEY,OATS,RYE,CORN,GRAIN,NES	67006	58301
8	MILK,WHOLE,FLUID,UNPROCESSED	2271	2074
9	EGGS IN THE SHELL	51648	42130
10	HONEY AND BEESWAX	9042	6834
11	NUTS,EDIBLE,NOT SHELLED	0	0
12	FRUITS,FRESH, EX.TROPICAL	27747	18960
13	VEGETABLES,FRESH	115007	81819
14	HAY,FORAGE,AND STRAW	0	0
15	SEEDS EX. OIL AND SEED GRADES	327	228
16	NURSERY STOCK & RELATED MAT.	53577	31775
17	OIL SEEDS,NUTS AND KERNELS	71727	61017
18	HOPS INC. LUPULIN	0	0
19	TOBACCO,RAW	0	0
20	MINK SKINS,RANCH UNDRESSED	0	0
21	WOOL IN GREASE	23	19
22	SERV. INCIDENTAL TO AGR. & FOREST	49161	49161
	Commodity Margins		
152	TRANSPORTATION & STORAGE	0	33303
158	WHOLESALE MARGINS	0	69675
159	RETAIL MARGINS	0	49586
168	TRANSPORTATION MARGINS	0	55182
Total		1000000	1000000

Table A5-2 Final Demand Vector: Bundle of Agri-Food Products of $1 Million Worth

	Commodity Name	Purchasers' Prices ($)	Producers' Prices ($)
33	BEEF,VEAL,MUTT&PORK,FRESH&FROZ	105770	89525
34	HORSE MEAT FRESH,CHILLED,FROZE	1043	923
35	MEAT,CURED	20158	15811
36	MEAT PREP. COOKED NOT CANNED	26121	20928
37	MEAT PREP. CANNED	2902	2060
38	ANIMAL OILS & FATS & LARD	1821	1428
39	MARGARINE,SHORTENING & LIKE PROD	8104	6075
40	SAUSAGE CASINGS, NATURAL & SYNTH.	0	0
41	PRIMARY TANKAGE	0	0
42	FEEDS OF ANIMAL ORIGIN NES	0	0
43	HIDES AND SKINS,RAW,NES	3996	3271
44	ANIMAL MAT.FOR DRUGS & PERFUME	684	639
45	CUSTOM WORK MEAT & FOOD	0	0
46	POULTRY,FRESH,CHILLED,FROZEN	33912	27376
47	POULTRY,CANNED	469	377
48	MILK,WHOLE,FLUID,PROCESSED	47943	41118
49	CREAM,FRESH	4362	3543
50	BUTTER	10546	8717
51	CHEESE,CHEDDAR & PROCESSED	40414	31057
52	MILK EVAPORATED	3762	2836
53	ICE CREAM	13451	10330
54	OTHER DAIRY PRODUCTS	16873	13575
55	MUSTARD MAYONNAISE	6949	4983
56	FISH PRODUCTS	0	0
57	FRUIT,BERRIES,DRIED,CRYSTALLIZE	8510	6744
58	FRUITS & PREPARATIONS CANNED	6887	4738
59	VEGET.FROZEN,DRIED & PRESERVED	12593	9192
60	VEGETABLES&PREPARATIONS CANNED	14308	10403
61	SOUPS CANNED	7612	5016
62	INFANT&JUNIOR FOODS,CANNED	3737	2448
63	PICKLES,RELISHES,OTHER SAUCES	12213	9077
64	VINEGAR	795	573
65	OTHER FOOD PREPARATIONS	17737	11819
66	PRIMARY OR CONCENTRATED FEEDS	100	90
67	FEED FOR COMMERCIAL LIVESTOCK	2135	1943
68	FEEDS, GRAIN ORIGIN, N.E.S.	889	724
69	FEEDS OF VEGETABLE ORIGIN NES	1157	1028
70	PET FEEDS	12729	8701
71	WHEAT FLOUR	1957	1634
72	CEREAL&FLOUR OF OTHER CEREALS&VE	641	463
73	BREAKFAST CEREAL PRODUCTS	12228	8690
74	BISCUITS	16193	11923
75	BREAD & ROLLS	33929	24847

76	OTHER BAKERY PRODUCTS	27252	19678
77	COCOA & CHOCOLATE	0	0
78	NUTS,KERNELS & SEEDS PREPARED	1076	761
79	CHOCOLATE CONFECTIONERY	19721	12065
80	OTHER CONFECTIONERY	17281	11037
81	BEET PULP	9	8
82	SUGAR	4159	2846
83	MOLASSES,SUGAR REFINERY PROD.	0	0
84	OILSEED,MEAL & CAKE	0	0
85	VEG. OILS & FATS, CRUDE	0	0
86	NITROGEN FUNCTION COMPOUNDS NES	0	0
87	MALT,MALT FLOUR&WHEAT STARCH	0	0
88	MAPLE SUGAR & SYRUP	5016	4271
89	PREPARED CAKE & SIMILAR MIXES	5204	4101
90	SOUPS,DRIED&SOUP MIXES&BASES	2592	1887
91	COFFEE, ROASTED, GROUND, PREPARED	21208	15605
92	TEA	610	645
93	POTATO CHIPS & SIMILAR PRODUCTS	13247	10100
94	MISC FOOD NES	26681	21271
95	SOFTDRINK CONCENTRATES & SYRUPS	0	0
96	CARBONATED BEV.,SOFT DRINKS	46440	31837
97	ALCOHOLIC BEVERAGES DISTILLED	56211	17409
98	ALCOHOL, NATURAL, ETHYL	27	24
99	BREWERS'& DISTILLERS'GRAINS	269	244
100	ALE BEER, STOUT & PORTER	106895	54859
101	WINES	15701	5593
102	TOBACCO PROCESSED, UNMANUFACT.	3862	3710
103	CIGARETTES	102464	29002
104	TOBACCO MFG EX.CIGARETTES	8446	3795
Commodity Margins			
158	WHOLESALE MARGINS	0	50278
159	RETAIL MARGINS	0	145103
168	TRANSPORTATION MARGINS	0	18203
Exogenous Commodity Margins			
173	INDIRECT TAXES	0	131261
Total		1000000	1000000

Table A5-3 Final Demand Vector: Bundle of Petrochemical Products of $1 Million Worth

Commodity Name		Purchasers' Prices ($)	Producers' Prices ($)
140	GASOLINE & FUEL OIL	691263	363604
141	OTHER PETROLEUM & COAL PROD	14760	12220
142	INDUSTRIAL CHEMICALS	0	0
143	FERTILIZERS	0	0
144	PHARMACEUTICAL	216342	129518
145	OTHER CHEMICAL PRODUCTS	77634	57102
Commodity Margins			
151	PIPELINE TRANSPORTATION	0	4055
157	OTHER UTILITIES	0	2
158	WHOLESALE MARGINS	0	149044
159	RETAIL MARGINS	0	91796
168	TRANSPORTATION MARGINS	0	18355
Exogenous Commodity Margins			
173	INDIRECT TAXES	0	174303
Total		1000000	1000000

APPENDIX J

TYPE I AND TYPE II MULTIPLIERS

TABLE A5-1 TYPE I AND TYPE II OUTPUT MULTIPLIERS

INDUSTRY NUMBER		TYPE I ESTIMATED	TYPE II ESTIMATED MODEL 1	TYPE II ESTIMATED MODEL 2	% DIFF
1	DAIRY FARMS	1.991	2.855	2.812	1.508
2	CATTLE FARMS	2.511	3.303	3.280	0.681
3	HOG FARMS	2.026	2.728	2.705	0.838
4	POULTRY FARMS	1.853	2.526	2.491	1.419
5	WHEAT FARMS	1.936	2.843	2.803	1.395
6	SMALL GRAIN FARMS	2.170	2.979	2.953	0.883
7	FIELD CROPS FARMS	1.702	2.471	2.419	2.096
8	FRUIT FARMS	1.598	2.524	2.466	2.326
9	VEGETABLE FARMS	1.811	2.597	2.538	2.296
10	MISCELLANEOUS SPECIALITIE FARMS	1.437	2.157	2.099	2.690
11	LIVESTOCK COMBINATION FARMS	2.018	2.739	2.719	0.746
12	OTHER COMBINATION FARMS	2.244	3.054	3.026	0.917
13	FISH & TRAPPING INDUSTRIES	1.389	2.261	2.231	1.323
14	LOGGING & FORESTRY INDUSTRIES	1.991	2.796	2.808	-0.421
15	MINING	1.587	2.288	2.282	0.302
16	CRUDE PETROLEUM & NATURAL GAS	1.648	2.267	2.251	0.736
17	QUARRY & SAND PIT INDUSTRIES	1.574	2.258	2.269	-0.486
18	SERVICE RELATED TO MINERAL EXTRAC	1.672	2.489	2.477	0.474
19	MEAT PRODUCTS INDUSTRY	2.777	3.514	3.509	0.160
20	POULTRY PRODUCTS	2.374	3.093	3.086	0.223
21	FISH PRODUCTS INDUSTRY	1.832	2.589	2.615	-1.029
22	FRUIT AND VEGETABLE INDUSTRIES	1.833	2.440	2.452	-0.504
23	DAIRY PRODUCTS INDUSTRIES	2.529	3.330	3.317	0.405
24	FEED INDUSTRY	2.432	3.086	3.085	0.008
25	VEGETABLE OIL MILLS (EXC. CORN OI	2.335	2.947	2.936	0.377
26	BISCUIT INDUSTRY	1.756	2.461	2.485	-0.952
27	BREAD & OTHER BAKERY PRODUCTS IND	1.798	2.562	2.590	-1.089
28	CANE & BEET SUGAR INDUSTRY	1.378	1.774	1.784	-0.567
29	MISC. FOOD PRODUCTS INDUSTRIES NE	1.887	2.513	2.517	-0.175
30	SOFT DRINK INDUSTRY	1.919	2.545	2.558	-0.543
31	DISTILLERY PRODUCTS INDUSTRY	1.691	2.313	2.310	0.105
32	BREWERY PRODUCTS INDUSTRY	1.704	2.385	2 382	0.127
33	WINE INDUSTRY	1.780	2.360	2.364	-0.192
34	TOBACCO PRODUCTS INDUSTRIES	1.876	2.498	2.489	0.355
35	RUBBER PRODUCTS INDUSTRIES	1.712	2.379	2.399	-0.863
36	PLASTIC INDUSTRIES	1.709	2.295	2.310	-0.663
37	LEATHER INDUSTRIES	1.574	2.224	2.271	-2.105
38	TEXTILE INDUSTRIES	1.568	2.130	2 155	-1.159
39	CLOTHING INDUSTRIES	1.572	2.219	2.270	-2.307
40	WOOD INDUSTRIES	2.098	2.892	2.911	-0.669
41	FURNITURE INDUSTRIES	1.760	2.481	2.516	-1.406
42	PAPER INDUSTRIES	2.001	2.709	2.712	-0.105
43	PUBLISHING & PRINTING IND	1.674	2.430	2.439	-0.377
44	PRIMARY STEEL INDUSTRIES	1.630	2.171	2.175	-0.161
45	METAL FABRICATING INDUSTRIES	1.728	2.388	2.400	-0.500
46	MACHINERY INDUSTRIES	1.536	2.146	2.156	-0.443
47	TRANSPORTATION EQUIPMENT IND	1.437	1.847	1.852	-0.249
48	ELECTRICAL PRODUCTS INDUSTRIES	1.460	2.044	2.049	-0 274
49	NON-METALLIC MINERAL PROD IND	1.702	2.361	2.372	-0.475
50	REFINED PETROLEUM & COAL PROD IND	2.101	2.598	2 587	0.438
51	CHEMICAL PRODUCTS INDUSTRIES	1.792	2.349	2.346	0 132
52	OTHER MANUFACTURED PROD IND	1.594	2.219	2.237	-0.813
53	CONSTRUCTION INDUSTRIES	1.764	2.502	2.515	-0.534
54	TRANSPORTATION INDUSTRIES	1.715	2.534	2.543	-0.374
55	PIPELINES TRANSPORTATION INDUSTRI	1.444	2.023	2 009	0.683
56	STORAGE & WAREHOUSING INDUSTRIES	1.556	2.343	2.358	-0.661
57	COMMUNICATION INDUSTRIES	1.356	2.173	2.181	-0.364
58	OTHER UTILITY INDUSTRIES	1.207	1.828	1.831	-0.163
59	WHOLESALE TRADE INDUSTRIES	1.481	2.339	2 348	-0.396
60	RETAIL TRADE INDUSTRIES	1.479	2.371	2.422	-2.128
61	FINANCE & REAL ESTATE INDUSTRIES	1.507	2.249	2.241	0.333

TABLE A5-1 TYPE I AND TYPE II OUTPUT MULTIPLIERS

INDUSTRY NUMBER		TYPE I ESTIMATED	TYPE II ESTIMATED MODEL 1	TYPE II ESTIMATED MODEL 2	% DIFF
62	INSURANCE INDUSTRIES	1.759	2.591	2.586	0.184
63	GOVERNT ROYALTIES ON NATL RESOURC	1.000	1.000	1.000	0.000
64	OWNER OCCUPIED DWELLINGS	1.121	1.763	1.698	3.725
65	BUSINESS SERVICES	1.438	2.399	2.369	1.255
66	EDUCATIONAL SERVICE INDUSTRIES	1.562	2.519	2.510	0.365
67	HEALTH & SOCIAL SERVICES	1.315	2.340	2.210	5.575
68	ACCOMMODATION SERVICE INDUSTRIES	1.680	2.532	2.603	-2.831
69	AMUSEMENT & RECREATION INDUSTRIES	1.626	2.380	2.399	-0.802
70	PERSONAL SERVICES	1.331	2.282	2.343	-2.677
71	OTHER SERVICES	1.405	2.269	2.303	-1.496
72	SUPPLIES INDUSTRIES	2.114	2.586	2.594	-0.301
73	TRAVEL & PROMOTION INDUSTRIES	2.386	3.088	3.103	-0.488
74	TRANSPORTATION MARGINS	2.656	3.450	3.459	-0.261