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HOW TO COMPUTE A JOHANSEN-STYLE SOLUTION WITH THE MELBOURNE VERSION OF ORANI 78

by

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HOW TO COMPUTE A JOHANSEN-STYLE SOLUTION WITH THE MELBOURNE VERSION OF ORANI 78

by

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I. Introduction

This manual is designed for users of ORANI who are sufficiently familiar with the ORANI theory[1] to be able to specify an experiment in terms of the ORANI notation but who do not necessarily have any experience with computing. In particular no familiarity with the ORANI computing system is assumed. The paper contains a set of instructions to enable you independently to compute ORANI solutions and print out the results. As you work through the instructions you will come to see how the computer systems relate to the ORANI theory, but a complete understanding of this relationship is definitely not essential

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1. All the necessary documentation is in Dixon Peter B., B.R. Parmenter, J. Sutton and D.P. Vincent (1982) ORANI : A Multisectoral Model of the Australian Economy, forthcoming with North-Holland Publishing Company - hereafter DPSV. Note that the computing system to which this document refers is an earlier version of the one used to produce the results in DPSV. It does not include a facility for producing Euler-style solutions.

to successful running of the model.[1] You should not be afraid to use this document as a "cookbook".

Before you embark on computation you must formulate your experiment in detail by making the choices 1-5 and 7 set out in Figure 44.1 of DPSV.[2] First decide which of the model's variables are to be set exogenously and which are to be endogenous in your simulation (choice 1). Compile a list of exogenous variables for the experiment equivalent to Table 23.3 in DPSV, which gives such a list for the case of an across-the-board tariff cut under neo-classical, short-run assumptions. Values for all the exogenous variables must also be set (choice 2). (Most of these will probably be zeros - in the experiment reported in DPSV, chapter 7, this was true of all the exogenous variables except the ad valorem tariff rates, t(i2,0)'s.) Next choose values for the user - specified indexing parameters (choice 3), and decide which commodities are to be "export" commodities (choice 4) and for which industries investment is to be exogenous (choice 5). Finally, choose the list of endogenous variables for which solution values are to be printed (choice 7). Then, if all the input-output data and all the parameter values in the standard ORANI data base are acceptable, this document can be used to prepare the deck of computer cards necessary to instruct the computer to run your simulation and print out the results.[3]

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1. For a summary of the relationship between the ORANI theory and the computing system see DPSV, section 34.

2. Choices 6 and 8 need not concern you at this stage. We shall not be dealing with the generation of Euler-style solutions nor with regional results.

3. It is possible to make user-specified changes to the data base but computing then becomes much more costly and difficult. We do not deal in this paper with the procedures necessary to make such changes.

The rest of this document is organized as follows. In section II we have set out the details (in terms of the choices from Figure 44.1 of DPSV) of an ORANI experiment which we will use as an example for our computing instructions. In section III we proceed, card by card, through the construction of the deck required for computing the example. The form of the output is explained in section IV and brief concluding remarks are offered in section V. An appendix explains the input formats required in preparing the card deck.

II. Details of an Illustrative Simulation

In explaing how to construct a card deck for computing an ORANI solution, we will work through the construction of such a deck for a specific, illustrative simulation. In Table II.1. we have set out the details of this experiment which must be fixed before computing commences.

You will notice that the list of exogenous variables, the values given to the user-specified parameters, and the lists of export commodities and exogenous-investment industries are all identical to the equivalent entries in Figure 44.1 of DPSV. This means that the economic environment assumed for our illustrative experiment is identical to that adopted for the tariff-change simulation described in chapter 7 of DPSV. To summarize, we assume a neoclassical short-run environment with fixed domestic absorption and slack labour markets. The main difference between the two experiments lies in the exogenous shock to be imposed on the model. Instead of imposing an across-the-board tariff increase, in our illustrative experiment we will analyse the effects of a change in relative, occupation-specific, real wage rates. The change in relativities is given by the values assigned to the wage-shift variables $\left(f^{(1)}_{(g+1,1,m)}\right)$ in Table II.1. The only other difference between the experiment specified in Table II.1 and the one specified in DPSV, Figure 44.1 is that, for the purposes of illustrating the computing, we aim to print out results for a much larger range of endogenous variables than was reported in DPSV. In fact we have demanded results for all available endogenous variables.

Table II.1 Specification of an Illustrative ORANI Experiment

The exogenous variables

$p^{m}_{(i2)}$; t(i2,0); v(i2,0); t(is,jk); v(is,jk); t(is,3); v(is,3);

$v(\ell 1,4)$; $x^{(4)}_{(r1)}$; t(i1,4); $k_j(0)^{(a)}$; c_R; i_R; n_j; $f^{(1)}_{(g+1,1)}$; $f^{(1)}_{(g+1,1,m)}$;

$f^{(1)}_{(g+1,1)j}$; $f^{(1)}_{(g+1,1,m)j}$; $f^{(5)}_{(is)}$; $f^{(2)}_{n}$; $f^{e}_{(i1)}$; $f^{(1)}_{g+2,j}$; q; ϕ; and

all a's except a(j); (for i = 1, ..., g; s = 1,2; j = 1, ...,h;

k = 1,2; $\ell \in G$; $r \notin G$; m = 1, ... , M; and $n \notin J$).[b]

Values for the exogenous variables

All zeros except the $f^{(1)}_{(g+1,1,m)}$ for m = 1 - 8. The values for these are

$f^{(1)}_{(g+1,1,1)} = -5.30$; $f^{(1)}_{(g+1,1,2)} = -7.74$; $f^{(1)}_{(g+1,1,3)} = 2.69$;

$f^{(1)}_{(g+1,1,4)} = -0.26$; $f^{(1)}_{(g+1,1,5)} = -1.73$; $f^{(1)}_{(g+1,1,6)} = -8.68$;

$f^{(1)}_{(g+1,1,7)} = 5.89$; $f^{(1)}_{(g+1,1,8)} = 1.62$.

Values for user-specified parameters (the h's)[c]

$h^{(5)}_{(is)}$, $h^{(1)}_{g+2,j}$, $h^{(1)}_{(g+1,1,m)j}$, $h^{(2)}_{\ell}$, $h_2(i2,0)$, $h_2(i1,4)$,

$h_1(is,jk)$, $h_3(is,jk)$, $h_1(is,3)$ and $h_3(is,3)$

all equal to 1; and

Table II.1 (continued)

$h_1(i2,0)$, $h_3(i2,0)$, $h_1(i1,4)$, $h_3(i1,4)$, $h_2(is,jk)$ and $h_2(is,3)$ all equal to 0;

(for $i = 1, \ldots, g$; $s = 1,2$; $j = 1, \ldots, h$; $k = 1,2$; $m = 1, \ldots, M$; and $\ell \notin J$).

The export commodities

G = {A1, A3, A4, A5, 11, 12, 13, 14, 18, 25, 30, 63, 64}

The exogenous-investment industries

$\{j \mid j \notin J\}$ = {17, 84, 85, 86, 103, 104, 105, 106, 107, 108, 112, 113}

Variables for which projections are to be printed

All endogenous variables in the final system (see Table III.2 part A, and DPSV, subsection 32.2).

All available back-solution variables (see Table III.2 part B).

(a) These variables have not been included in the ORANI 78 computer system, and hence they do not appear in Table III.2. In their place appears the variable $(1 + t(\ell i,4))$, i.e., the power of the ad valorem export subsidy on commodity ℓ ($\ell \varepsilon G$). In Table III.2 this is variable 6 (mnemonic S).

(b) This variable has not been included in the ORANI 78 computer system, hence it does not appear in Table III.2. Ignoring the variable will cause no problems in the computing but you will not be able to impose wage shifts that are occupation and industry specific, nor can you solve for such shifts.

(c) Note that in the current version of the program only the values of the $h^{(1)}_{g+2,j}$ and the $h^{(1)}_{(g+1,1,m)j}$ can be varied by users. All the other h's must take their default values, i.e., the values listed in the table.

III. Preparing the Card Deck

The ORANI computing system has been established on the CSIRONET computer facility. In this section we describe the compilation of a card deck which will instruct that system to compute and print out a solution for the ORANI experiment described in section II. The deck contains four sections: a set of control cards which control the operation of the entire job in the machine; a set of cards which specify the economic environment and set up the basic solution; a set of cards to determine which ORANI variables (of those that were eliminated in obtaining the final ORANI system)[1] are required via backsolution; and, finally, a set of cards which specify details of the printout of results.

A schematic summary of the deck is set out in Table III.1. The table contains three columns, the first identifying the card (or block of cards) under consideration, the second indicating the sub-sections in which the content of the card is explained, and the third referencing the position of the card in our illustrative deck. Cards (or blocks of cards) for which the descriptions are not enclosed in brackets in Table III.1 are compulsory in all ORANI 78 simulation decks in which results for some back solutions as well as basic-solution endogenous variables are required.[2] Cards (or blocks) which are enclosed in brackets may not be required depending on what options are selected in running the simulation. Table III.1 is intended as a guide for preparing the deck - it outlines the necessary structure of the deck but ommits the details of the individual cards.

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1. See DPSV, section 32.

2. If no back solutions were required, all cards referring to the back-solution parts of the programs could be omitted (e.g., in our illustrative deck, cards 10 and 39-53).

Table III.1 Schematic Representation of the ORANI 78 Computing Deck

Description of card(s)	Subsection in which punching is described	Card numbers in illustrative deck
CONTROL SECTION		
Control cards	III.1	1-11
End of section	III.1	12
BASIC-SOLUTION SECTION	III.2	
Basic-solution steering card	III.2.1	13
Card identifying 1st endogenous vector variable	III.2.2(a)	14
(Endogenous components of 1st endogenous vector variable)	III.2.2(b),(c)	
Card identifying 2nd endogenous vector variable	III.2.2(a)	15
(Endogenous components of 2nd endogenous vector variable)	III.2.2(b),(c)	
⋮		
Card identifying last endogenous vector variable	III.2.2(a)	32
(Endogenous components of last endogenous vector variable)	III.2.2(b),(c)	
Blank card		33
Card identifying non-zero exogenous variables	III.2.3	34
Steering card for indexation, etc.	III.2.4.1	35
(Wage-indexation card(s))	III.2.4.2	
(Endogenous-export card(s))(*)	III.2.4.3	36
(Exogenous-investment card(s))(*)	III.2.4.4	37
("Other cost" indexation card(s))	III.2.4.5	
End of section	III.2.5	38
BACK-SOLUTION SECTION	III.3	
Card identifying non-zero exogenous variables	III.3.1	39
Card(s) specifying endogenous variables for which back solutions are required	III.3.2	40-52
End of section	III.3.3	53

Table III.1 (Continued)

Description of card(s)	Subsection in which punching is described	Card numbers in illustrative deck
PRINTOUT SECTION	III.4	
Printout steering card	III.4.1	54
(Title card)	III.4.2	55
(Tariff rate card(s))	III.4.3	
Card identifying 1st non-zero exogenous vector variable	III.4.4(a)	56
(Non-zero exogenous components of 1st non-zero exogenous vector variable)	III.4.4(b)	
(Values for 1st non-zero exogenous vector variable)	III.4.4(c)	57,58
⋮		
Card identifying last non-zero exogenous vector variable	III.4.4(a)	
(Non-zero components of last non-zero exogenous vector variable)	III.4.4(b)	
(Values for last non-zero exogenous vector variables)	III.4.4(c)	
Blank card		59
(Card specifying partial printing of endogenous vectors)	III.4.5	
Blank card	III.4	60
End of information	III.5	61

Footnotes

(*) These cards are optional only in the sense that they are omitted if there are no endogenous-export commodities or exogenous-investment industries in your simulation.

III.1 The control cards

Before the control cards can be set up four pieces of information are necessary,

(i) an account code to which the computing costs will be charged, (Our illustrative simulation uses a fictional account, code ABCDEF.)

(ii) a personal user identification code, (Ours is DIAXPH.)

(iii) a personal password of up to six characters, (We use PEDRO in the example.)

(iv) the node identifier at which the output of the job will appear. (MK is the Melbourne IMPACT node.)

You will also have to choose

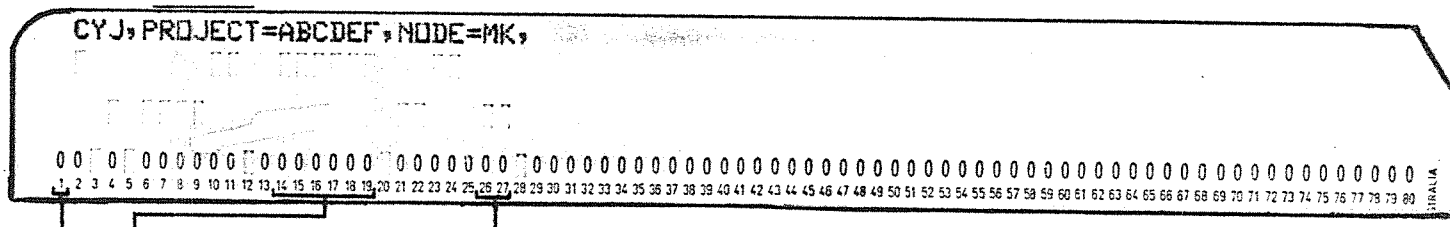
(v) a program name for your simulation. This may be up to six characters long, it must commence with an alphabetic character but the remaining characters may be alphabetic and/or numeric. (We have chosen LABOR in the example.)

(vi) a prefix for the labels which will be attached by the computer to any files which are created in the course of your job. This prefix may be up to nine characters long, it must commence with an alphabetic character but the remaining characters may be alphabetic and/or numeric. (For the job in our example we have chosen PHWRP.)

(vii) two file passwords, one to allow you to read files which are created in the course of your job, and a second to allow you to modify the files after they have been created, should this be necessary. Again these may be up to six characters long, they must commence with an alphabetic character but the remaining characters may be alphabetic and/or numeric. (We have chosen LABTK and LABXR for these. The first type of password is known as a turnkey password and the second as an except read password. You may find it convenient to include the letters TK or XR in your passwords to distinguish the two types.)

With items (i) - (vii) settled proceed to punch your control cards as follows:

Card 1



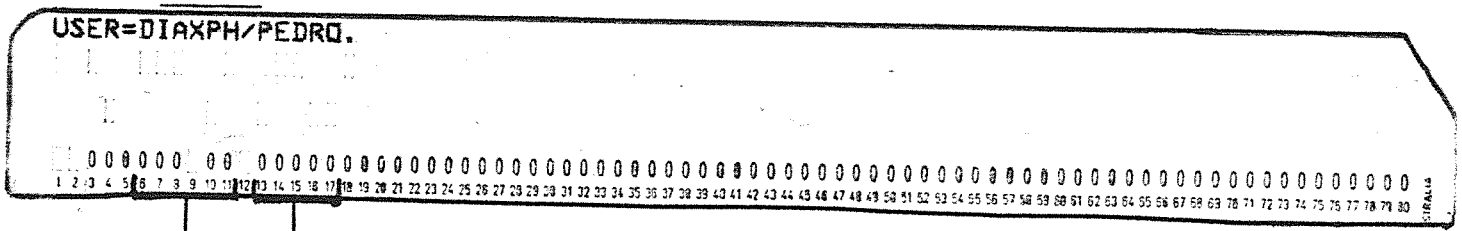
In the first column multipunch 6, 7, 8, 9.

Enter your account code here (see item (i) on p.10).

Enter the node identifier here (see item (iv) on p.10).

This card allows you to establish contact with the computer in Canberra, assigns your charges to an account and your output to a node. You may find it convenient to use a pink card for the first card of your deck.

Card 2

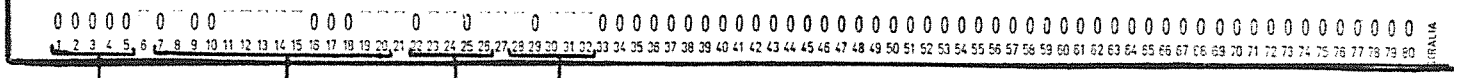


Enter your user identification code here (see item (ii),p.10).

Enter your personal password here (see item (iii),p.10). This prevents other users from using your identification code. The password should therefore be kept confidential.

Card 3

```
LABOR,MS140000,ML300,P0070,T1000.
```



* Enter the program name for your simulation here (see item (v),p.10).

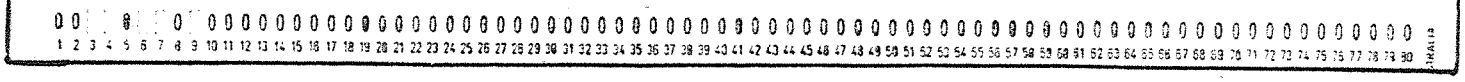
* These entries specify how much computer-memory space is available to you. For an ORANI job you will need the maximum allowable so that you should always used the values shown here.

* This entry determines the priority which your job will receive in the computer. P0070 is the lowest priority and will usually run your job overnight. Higher priorities are available but also more costly. Check with the node manager if you think you need higher priority.

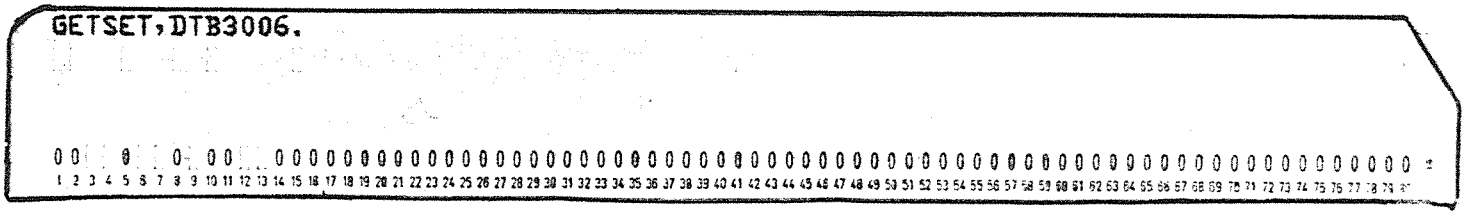
* This entry puts a time limit on your job. T1000 allows plenty of time for a standard ORANI run.

Cards 4 - 7

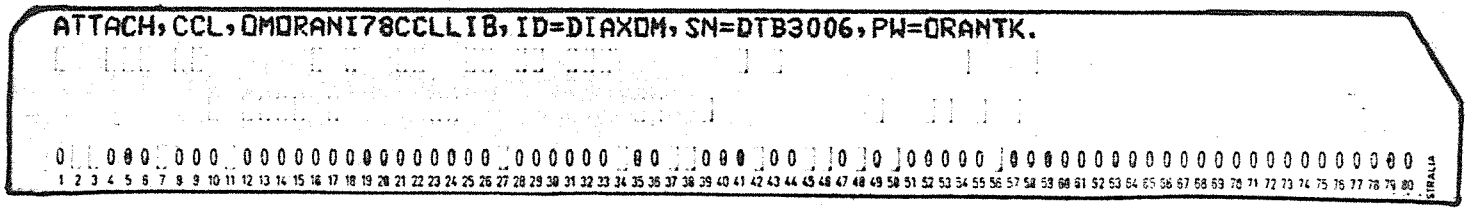
```
GETSET,DTB2344.
```



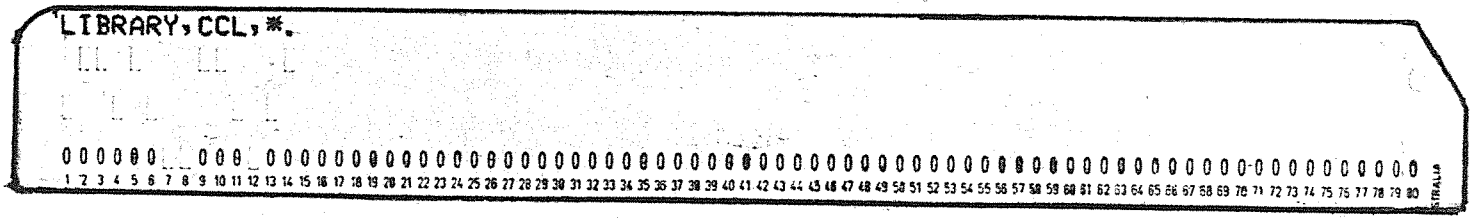
```
GETSET,DTB3006.
```



```
ATTACH,CCL,OMORANI78CCLLIB,ID=DIAXOM,SN=DTB3006,PW=ORANTK.
```

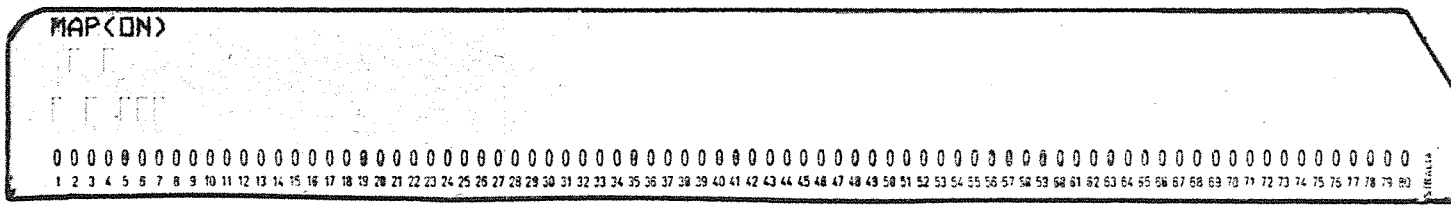


```
LIBRARY,CCL,*.
```



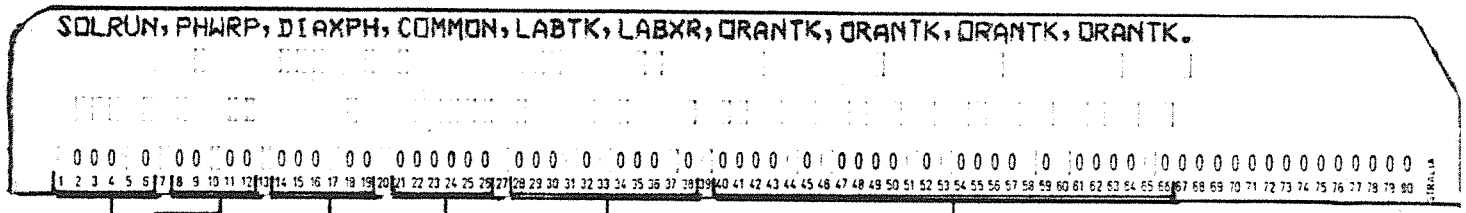
You should never have to vary these cards. They activate the disc which stores the ORANI program libraries and call these for later use.

Card 8



This card is optional. It directs the computer to include in your printout some material which may be useful in diagnosing possible errors in your program.

Card 9



* This entry instructs the computer to run the ORANI basic-solution program.

* Enter the label prefix for your files here (see item (vi), p.10). It will distinguish your SOLRUN files from those which may be created by other users.

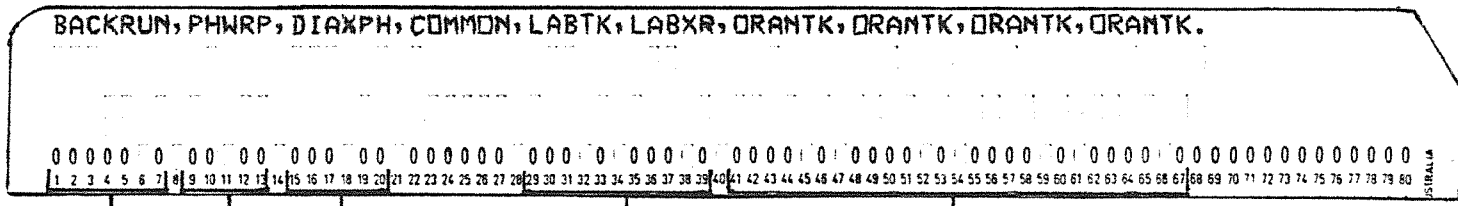
* Your user identification code (see card 2).

* This entry indicates that the computer will use generally available (as opposed to user-specific) storage space in processing your job. If you intend to use user-specific space consult your node manager.

* Your file passwords (see item (vii), p.10).

* These are ORANI passwords and must be included to allow files required by the basic-solution program to be read.

Card 10



This entry instructs the computer to run the ORANI back-solution program.

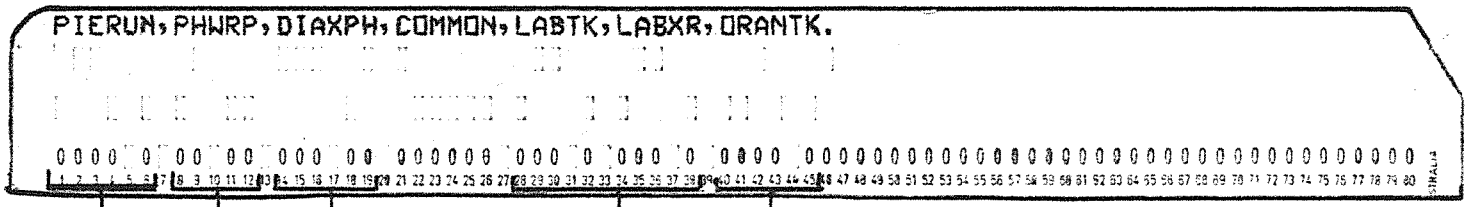
Your label prefix

Your user identification code

Your file passwords

ORANI passwords

Card 11



Analagous to cards 9 and 10 but runs the program which prints your results.

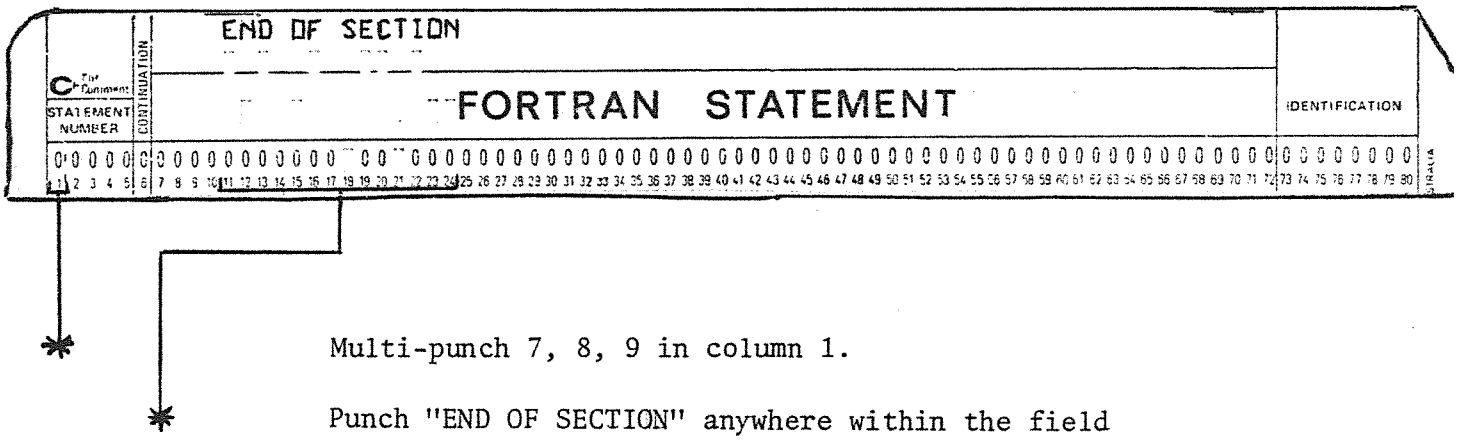
Your label prefix

Your user identification code

Your file passwords

An ORANI password

Card 12



Multi-punch 7, 8, 9 in column 1.

Punch "END OF SECTION" anywhere within the field of columns 2 to 80.

This card concludes the control cards. A card like this is used at the end of each section of your deck. You may find it convenient to use blue cards to divide the deck.

III.2 Specifying the basic solution

A note on mapping between the DPSV notation and the computer codes

In order to punch the cards for this section of the deck you will need the information contained in Tables III.2 - III.4. In the ORANI computing system, vectors of ORANI variables are identified by numeric and mnemonic codes. Table III.2 gives a correspondence between the computer codes and the notation used for the ORANI variables in DPSV, chapter 3. You have already used the latter in fixing the details of your experiment. (The details for our illustrative experiment are set out, using this notation, in section II.) Table III.3 contains the numeric codes used in the computing to identify the commodities and industries distinguished in ORANI. The industry codes are identical to those used in DPSV. For computing purposes, commodities are coded consecutively from 1 to 115. In DPSV they were numbered A1 - A9 and 8 - 113 in order to provide as close a correspondence as possible between commodity codes and the codes of the corresponding, producing industries. Table III.4 contains the occupation codes.

You will need all three tables to translate the details of your experiment from the ORANI notation to a form which can be accepted by the ORANI programs.

Table III.2 Vector Variables which Appear Explicitly in the ORANI Computing System[a]

A. Variables in the final system

CODE NO.	COMPUTER MNEMONIC	DESCRIPTION	TYPICAL ELEMENT (DPSV NOTATION)[b]	STANDARD NO. OF COMPONENTS
1	$Z_{\wedge}$[c]	industry outputs	z_j	113
2	XA	agricultural commodity outputs	$x^{(0)}_{(i1),\, i\varepsilon a^*(d)}$	9
3	X4	exogenous commodity exports	$x^{(4)}_{(i1),\, i\notin G}$[e]	102
5	PA	agricultural commodity prices (basic values)	$p^{(0)}_{(i1),\, i\varepsilon a^*(d)}$	9
6	$S_{\wedge}$	powers of exogenous ad valorem export subsidies	$(1+t(i1,4)),\, i\varepsilon G$[e]	13
7	PM	import prices (foreign currency)	$p^{m}_{(i2)}$	115
8	$T_{\wedge}$	ad valorem tariff rates	$t(i2,0)$	115
9	ER	exchange rate ($A/$US)	ϕ	1
10	$R_{\wedge}$	rates of return by industry	$r_j(0)$	113
11	Q3	rental prices on agricultural land	$p^{(1)}_{(g+1,3)j}$	7[f]
12	N1	employment by occupation	ℓ_m	9
13	K0[g]	base period capital stocks by industry	$k_j(0)$	113
14	N3	employment of agricultural land	n_j	7[f]
15	BT	balance of trade ($A billion)	ΔB	1
16	$M_{\wedge}$	aggregate imports (foreign currency)	m	1
17	$E_{\wedge}$	aggregate exports (foreign currency)	e	1
18	IP	investment price index	$\xi^{(2)}$	1
19	CP	consumer price index	$\xi^{(3)}$	1
20	IR	aggregate real investment	i_R	1
21	CR	aggregate real consumption	c_R	1
22	FR	ratio of real consumption to real investment	f_R	1
23	U1	aggregate employment (hours)[h]		1
24	U2	aggregate employment (persons)	ℓ	1
25	GN	gross national product[i]		1
26	$K_{\wedge}$	aggregate capital stock	$k(0)$	1
27	IM	aggregate nominal investment	i	1

Table III.2 (continued)

CODE NO.	COMPUTER MNEMONIC	DESCRIPTION	TYPICAL ELEMENT (DPSV NOTATION) [b]	STANDARD NO. OF COMPONENTS
28	CM	aggregate nominal consumption	c	1
29	$Q_{\wedge}$	number of households	q	1
30	LM	economy-wide rate of return	ω	1
31	FE	shift term for exports	$f^{e}_{(i1)}$	115
32	$F\emptyset^{(g)}$	shift term for occupation wage rates	$f^{(1)}_{(g+1,1,m)}$	9
33	FI	shift term for industry wage rates	$f^{(1)}_{(g+1,1)j}$	113
34	FG	shift term for average wage rate	$f^{(1)}_{(g+1,1)}$	1
35	FX	shift term for other costs	$f^{(1)}_{g+2,j}$	113
36	F2	shift term for exogenous investment	$f^{(2)}_{j}$	$113-J^{*(j)}$
37	F5	shift term for other usage (domestic)	$f^{(5)}_{(i1)}$	115
38	F6	shift term for other usage (imports)	$f^{(5)}_{(i2)}$	115
39	YI	$YUK^{(k)}$ - cost of capital equation	$(b_1)_j$	113
40	YP	$YUK^{(k)}$ - price equation	$(b_2)_j$	113
41	YC	$YUK^{(k)}$ - domestic consumption equation	$(b_3)_i$	115
42	ZC	$YUK^{(k)}$ - import consumption equation	$(b_4)_i$	115
43	YL	$YUK^{(k)}$ - labour demand equation	$(b_5)_m$	9
44	YK	$YUK^{(k)}$ - capital demand equation	$(b_6)_j$	113
45	YN	$YUK^{(k)}$ - land demand equation	$(b_7)_j$	7
46	YX	$YUK^{(k)}$ - domestic market clearing equation	$(b_8)_i$	115
47	ZX	$YUK^{(k)}$ - imports market clearing equation	$(b_9)_i$	115
48	YW	$YUK^{(k)}$ - export cost equation	$(b_{11})_i$	115
49	Y3	$YUK^{(k)}$ - CPI equation	b_{12}	1
50	Y2	$YUK^{(k)}$ - import price equation	$(b_{10})_i$	115
51	YA	$YUK^{(k)}$ - CRETH equation	$(b_{13})_i$	$9^{(1)}$

Table III.2 (continued)

B. Back-solution variables

CODE NO.	COMPUTER MNEMONIC	DESCRIPTION	TYPICAL ELEMENT(b)	STD.NO.OF COMPONENTS
72	S1	endogenous export subsidies	$v(i1,4), i \notin G^{(e)}$	102
73	XN	endogenous commodity exports	$x^{(4)}_{(i1)}, i \in G^{(e)}$	13
74	XL	commodity imports	$x^{(0)}_{(i2)}$	115
75	PN	non-agricultural commodity prices	$p^{(0)}_{(i1)}, i \notin a^{*(d)}$	106
76	X3	consumption of domestic commodities	$x^{(3)}_{(i1)}$	115
77	$Y_{\wedge}$	investment by industry	y_j	113
78	K1	next period capital stocks by industry	$k_j(1)$	113
79	LI	employment by industry	$x^{(1)}_{(g+1,1)j}$	113
80	P1	domestic prices (basic values)	$p^{(0)}_{(i1)}$	115
81	P2	import prices (basic values)	$p^{(0)}_{(i2)}$	115
82	PI	unit costs of capital by industry	π_j	113
83	Q2	rental prices of capital by industry	$p^{(1)}_{(g+1,2)j}$	113
84	XM	consumption of imports	$x^{(3)}_{(i2)}$	115

NOTES

(a) Variables 1-3 and 5-51 are in the ORANI final system (see DPSV, subsection 32.3). Variables 72-84 are obtained by back solution.

(b) In this column we have generally used the notation which was introduced in DPSV, chapter 3 (see especially Table 23.2). For variables 39-51, however, we have used the notation of DPSV, Table 32.2.

(c) The symbol "$\wedge$" denotes a blank space.

(d) a^* denotes the set of agricultural commodities.

(e) Note that G is the set of commodities for which exports are to be set endogenously. The selection of such commodities is user-determined but in most ORANI applications the set G has been composed of the 13 commodities listed in the relevant part of Table II.1. To conform with this we have given "13" as the standard number of components for G.

(f) In DPSV, Table 23.2 this variable is described as containing h(=113) components. In the ORANI input-output data base only the first 7 industries use agricultural land and only the 7 non-zero components of the variable have been included in the computing system.

(g) To overcome possible confusion with respect to the computer mnemonics, we have written zero as "0" and the alphabetic O as "Ø".

(h) This variable does not appear in the version of ORANI discussed in DPSV, but it is included in the ORANI 78 computer system. You will have to account for it on your computer cards. Always treat it as an endogenous variable but ignore it in looking at your output. The only reliable index of aggregate employment in ORANI 78 is U2.

(i) This variable is not mentioned in DPSV and its value is not reliable in the ORANI 78 system. In computing always treat it as endogenous and ignore it in your output.

(j) J^* is the number of endogenous-investment industries (DPSV, section 23). Hence $(113-J^*)$ is the standard number of exogenous-investment industries.

(k) The YUK variables correspond in the final system to the b variables in the condensed system. See DPSV, tables 32.1 and 32.2.

(l) This is the number of agricultural commodities.

TABLE III.3 Commodity and Industry Codes for ORANI 78 Computer Programs

IDENTIFICATION NO.	DPSV CODE	COMMODITY	IDENTIFICATION NO.	INDUSTRY
1	A1	Wool	1	Pastoral zone
2	A2	Sheep	2	Wheat/sheep zone
3	A3	Wheat	3	High rainfall zone
4	A4	Barley	4	Northern beef
5	A5	Other cereal grains	5	Milk cattle
6	A6	Meat cattle	6	Other farming export
7	A7	Milk cattle	7	Other farming import competing
8	A8	Other farming export	8	Poultry
9	A9	Other farming import competing	9	Services to agriculture
10	8	Poultry	10	Forestry
11	9	Services to agriculture	11	Fishing
12	10	Forestry	12	Iron
13	11	Fishing	13	Other metallic minerals
14	12	Iron	14	Coal
15	13	Other metallic minerals	15	Crude oil
16	14	Coal	16	Non-metallic minerals n.e.c.
17	15	Crude oil	17	Services to mining
18	16	Non-metallic minerals n.e.c.	18	Meat products
19	17	Services to mining	19	Milk products
20	18	Meat products	20	Fruit & veg products
21	19	Milk products	21	Marge, oils & fats
22	20	Fruit & veg products	22	Flour & cereal prods
23	21	Marge, oils & fats	23	Bread, cakes
24	22	Flour & cereal prods	24	Confectionery
25	23	Bread, cakes	25	Food products n.e.c.
26	24	Confectionery	26	Soft drinks, cordials
27	25	Food products n.e.c.	27	Beer & malt
28	26	Soft drinks, cordials	28	Alcoholic drinks n.e.c.

Table III.3 (continued)

IDENTIFICATION NO.	DPSV CODE	COMMODITY	IDENTIFICATION NO.	INDUSTRY
29	27	Beer & malt	29	Tobacco
30	28	Alcoholic drinks n.e.c.	30	Prepared fibres
31	29	Tobacco	31	Man-made fibres, yarn
32	30	Prepared fibres	32	Cotton, silk, flax
33	31	Man-made fibres, yarn	33	Wool & worsted yarns
34	32	Cotton, silk, flax	34	Textile finishing
35	33	Wool & worsted yarns	35	Textile floor covers
36	34	Textile finishing	36	Textile products n.e.c.
37	35	Textile floor covers	37	Knitting Mills
38	36	Textile products n.e.c.	38	Clothing
39	37	Knitting mills	39	Footwear
40	38	Clothing	40	Sawmill products
41	39	Footwear	41	Plywood, veneers
42	40	Sawmill products	42	Joinery & wood prods
43	41	Plywood, veneers	43	Furniture, mattresses
44	42	Joinery & wood prods	44	Pulp, paper
45	43	Furniture, mattresses	45	Fibreboard
46	44	Pulp, paper	46	Paper products n.e.c
47	45	Fibreboard	47	Newspapers & books
48	46	Paper products n.e.c.	48	Commercial printing
49	47	Newspapers & books	49	Chemical fertilisers
50	48	Commercial printing	50	Industrial chemicals
51	49	Chemical fertilisers	51	Paints, varnishes
52	50	Industrial chemicals	52	Pharmaceuticals
53	51	Paints, varnishes	53	Soap & detergents
54	52	Pharmaceuticals	54	Cosmetics, toiletry
55	53	Soap & detergents	55	Chemical prods n.e.c.
56	54	Cosmetics, toiletry	56	Oil & coal products

Table III.3 (continued)

IDENTIFICATION NO.	DPSV CODE	COMMODITY	IDENTIFICATION NO.	INDUSTRY
57	55	Chemical prods n.e.c.	57	Glass
58	56	Oil & coal products	58	Clay products
59	57	Glass	59	Cement
60	58	Clay products	60	Ready-mixed concrete
61	59	Cement	61	Concrete products
62	60	Ready-mixed concrete	62	Non-metal min. prods
63	61	Concrete products	63	Basic iron & steel
64	62	Non-metal min. prods	64	Other basic metals
65	63	Basic iron & steel	65	Structural metal
66	64	Other basic metals	66	Sheet metal prods
67	65	Structural metal	67	Metal products n.e.c.
68	66	Sheet metal prods	68	Motor vehicles, parts
69	67	Metal products n.e.c.	69	Ship & boat building
70	68	Motor vehicles, parts	70	Locomotives
71	69	Ship & boat building	71	Aircraft building
72	70	Locomotives	72	Scientific equipt
73	71	Aircraft building	73	Electronic equipt
74	72	Scientific equipt	74	Household appliances
75	73	Electronic equipt	75	Electrical machinery
76	74	Household appliances	76	Agricultural mach.
77	75	Electrical machinery	77	Construction equipt
78	76	Agricultural mach.	78	Other machinery
79	77	Construction equipt	79	Leather products
80	78	Other machinery	80	Rubber products
81	79	Leather products	81	Plastic products
82	80	Rubber products	82	Signs, writing equipt
83	81	Plastic products	83	Other manufacturing

Table III.3 (continued)

IDENTIFICATION NO.	DPSV CODE	COMMODITY	IDENTIFICATION NO.	INDUSTRY
84	82	Signs, writing equipt	84	Electricity
85	83	Other manufacturing	85	Gas
86	84	Electricity	86	Water, sewerage
87	85	Gas	87	Residential building
88	86	Water, sewerage	88	Building n.e.c.
89	87	Residential Building	89	Wholesale trade
90	88	Building n.e.c.	90	Retail trade
91	89	Wholesale trade	91	Motor vehicle repair
92	90	Retail trade	92	Other repairs
93	91	Motor vehicle repair	93	Road transport
94	92	Other repairs	94	Railway transport
95	93	Road transport	95	Water transport
96	94	Railway transport	96	Air transport
97	95	Water transport	97	Communication
98	96	Air transport	98	Banking
99	97	Communication	99	Finance & life ins.
100	98	Banking	100	Other insurance
101	99	Finance & life ins.	101	Investment, real estate
102	100	Other insurance	102	Other business services
103	101	Investment, real estate	103	Ownership of dwellings
104	102	Other business services	104	Public administration
105	103	Ownership of dwellings	105	Defence
106	104	Public administration	106	Health
107	105	Defence	107	Education, libraries
108	106	Health	108	Welfare services
109	107	Education, libraries	109	Entertainment
110	108	Welfare services	110	Restaurants, hotels
111	109	Entertainment	111	Personal services

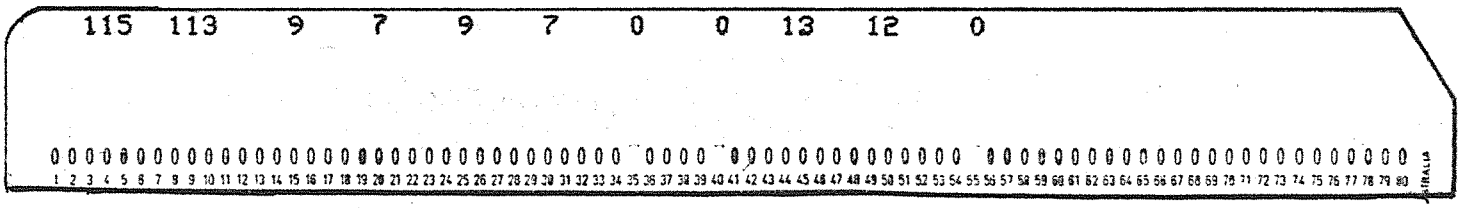
Table III.3 (continued)

IDENTIFICATION NO.	DPSV CODE	COMMODITY	IDENTIFICATION NO.	INDUSTRY
112	110	Restaurants, hotels	112	Business expenses
113	111	Personal services	113	Non-competing imports
114	112	Business expenses		
115	113	Non-competing imports		

TABLE III.4 : Occupational Codes

IDENTIFICATION NUMBER	DESCRIPTION
1	Professional White Collar
2	Skilled White Collar
3	Semi- and Un-skilled White Collar
4	Skilled Blue Collar - Metal and Electrical
5	Skilled Blue Collar - Building
6	Skilled Blue Collar - Other
7	Semi- and Un-skilled Blue Collar
8	Rural Workers
9	Armed Services

III.2.1 : Basic-solution steering card



On this card you must punch 11 numbers (in format 11I5[1]) representing the values of the following items for your experiment. *Note that you must punch the numbers in the order shown.*

(i) the number of commodities (115),

(ii) the number of industries (113),

(iii) the number of labour occupations (9),

(iv) the number of types of agricultural land (7),

(v) the number of agricultural commodities (9),

(vi) the number of agricultural industries (7),

(vii) the number of extra equations (i.e., equations not included in the standard version of ORANI) (0),

(viii) the number of extra variables (i.e., not included in the standard version of ORANI) (0),

(ix) the number of endogenous-export commodities (13),

(x) the number of exogenous-investment industries (12),

(xi) the number of commodities for which imports are exogenous (0).

Items (vii) and (viii) are concerned with the facility for adding extra equations and variables to the standard version of the model

---

1. The punching formats required in the ORANI deck are described in the Appendix. See subsection A.1.

(see DPSV, sub-section 36.2). You will not need this facility in standard ORANI runs but must still punch zeros for these items on the computer card.

For standard runs of ORANI your card should be identical to our example with the possible exception of items (ix) - (xi).

III.2.2 The endogenous variables

On the next sequence of cards you specify details of the endogenous variables for your experiment. Part A of Table III.2 (i.e., variables 1-3 and 5-51) is a list of all the vector variables in the final ORANI system. *Begin by excluding from this list all the variables which are exogenous in your experiment.*

> [The exogenous variables for our illustrative experiment are listed in Table II.1. You can see that these comprise all the components of vector variables 3, 6-9, 13, 14, 20, 21, 29 and 31-51 in Table III.2.[1]]

Check that the number of components left as endogenous in Table III.2. part A totals 273.

> [You can see that this is the case for our endogenous variables, i.e., all components of vector variables 1, 2, 5, 10-12, 15-19, 22-28 and 30]

Now you must punch one or more cards for each of the vector variables in Part A of Table III.2 which is wholly or partly endogenous in your experiment. These sets of cards must be entered in the deck in the order in which the variables appear in Table III.2.

---

1. Note that the v(i2,0), t(is,jk), v(is,jk), t(is,3), v(is,3), t(i1,4) and all the a's which are listed in Table II.1, do not appear explicitly in Table III.2. They are, however, incorporated in some of the "YUK" variables (i.e., variables 39-51 in Table III.2). See also DPSV, Table 32.2.

For each vector

(a) punch a master card in format A2,8X,2I5[1] containing

- the mnemonic for the vector (see Table III.2) in columns 1-2, (starting in column 1)
- the number of endogenous components (columns 11-15, ending in column 15)
- a command number (columns 16-20)
  - leave these columns blank if all components of the vector are endogenous
  - punch "1" in column 20 if the identification[2] numbers of the endogenous components are to be read in one at a time. Then specify them as in (b) below
  - if the identification numbers of the endogenous components are to be read in blocks, punch the number of such blocks in columns 16-20 and then specify the blocks as in (c) below.

(b) if "1" was punched as the command number on the master card (see III.2.2(a) above) punch the identification numbers (in ascending order) of the endogenous components in format 16I5[3]. Conclude with a dummy component, "ΛΛΛ-1".[4]

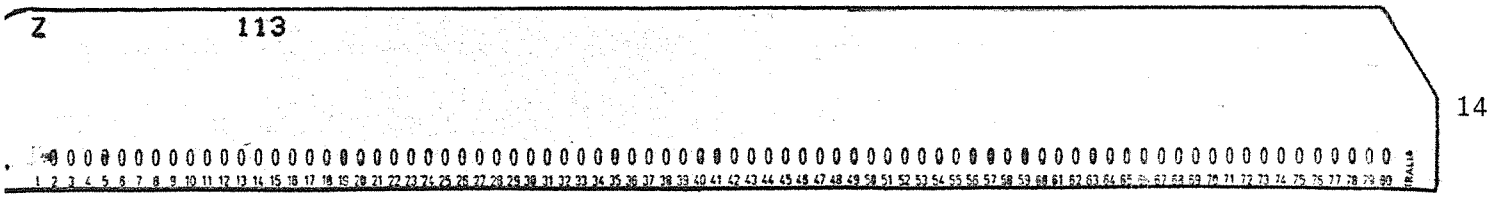
(c) if a command number "n" (n>1) was punched in columns 16-20 on the master card, the identification numbers of the endogenous components must be entered in n blocks. Punch the numbers of the first and last components of each block in format 8(2X,2I4)[5]. Conclude with a dummy block "ΛΛΛΛ-1ΛΛ-1". Note that a single block of components must be split into at least 2 blocks in order to be entered in this way. For example the block 10-115 could be entered as"ΛΛΛΛ10ΛΛ10ΛΛΛΛ11Λ115ΛΛΛΛ-1ΛΛ-1".

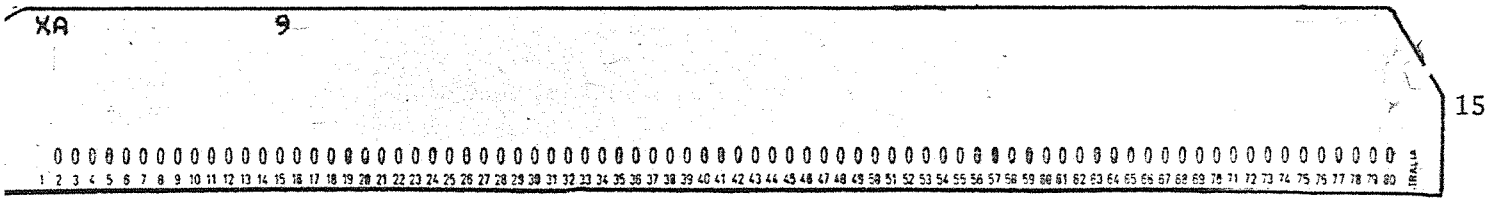
Conclude the endogenous-variable cards with a blank card.

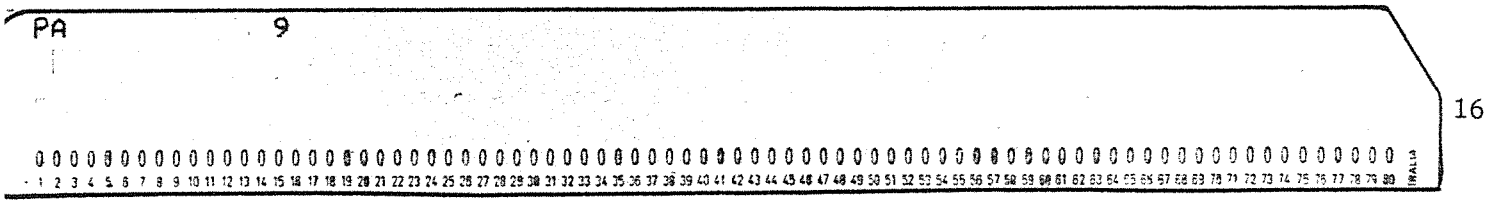
---

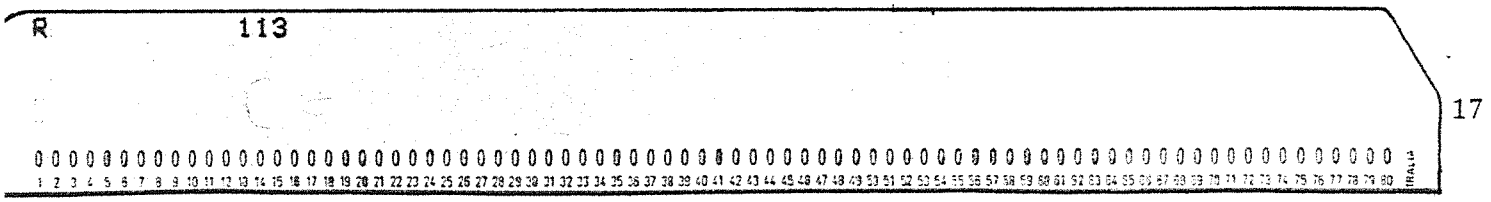
1. See Appendix, subsection A.2.
2. Note that we use "identification numbers" to refer to the components of a vector variable and "code numbers" (listed in table III.2) to refer to the vector variables.
3. See Appendix, subsection A.1.
4. The symbol "Λ" denotes a blank space.
5. See Appendix, subsection A.3.

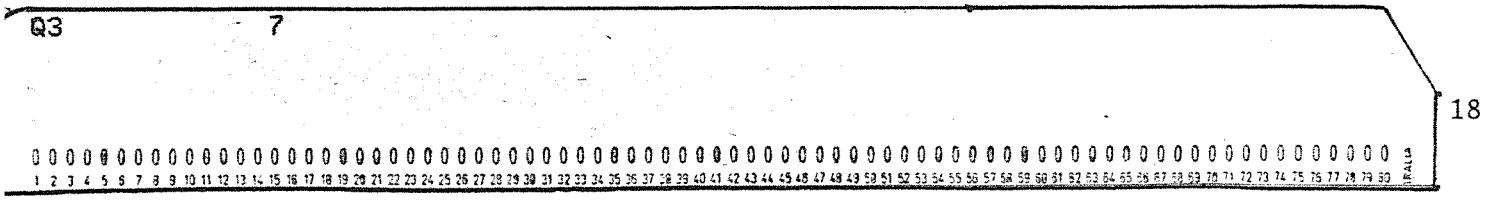
[All the endogenous vector variables in our illustrative experiment are wholly endogenous. Hence only one card (the master card) is required for each vector. Cards 14-33 are the required cards, including the final blank (33).]

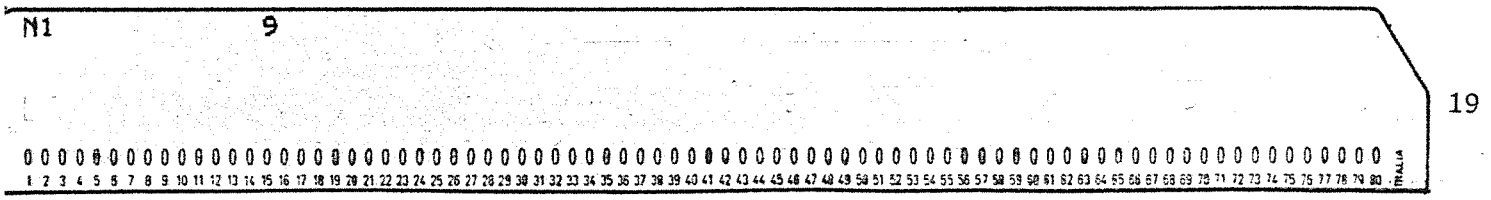


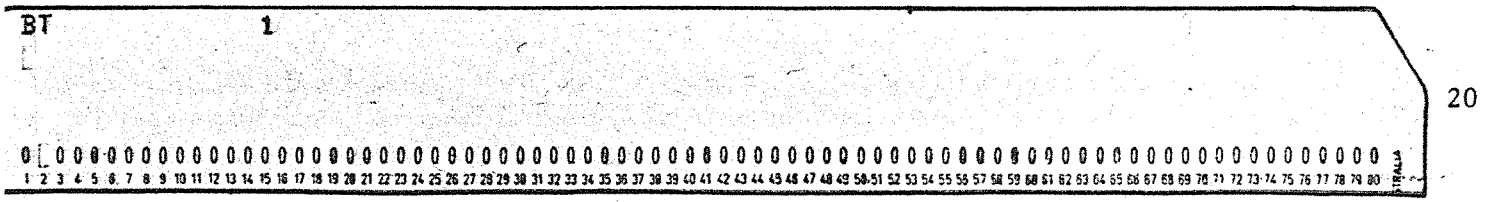


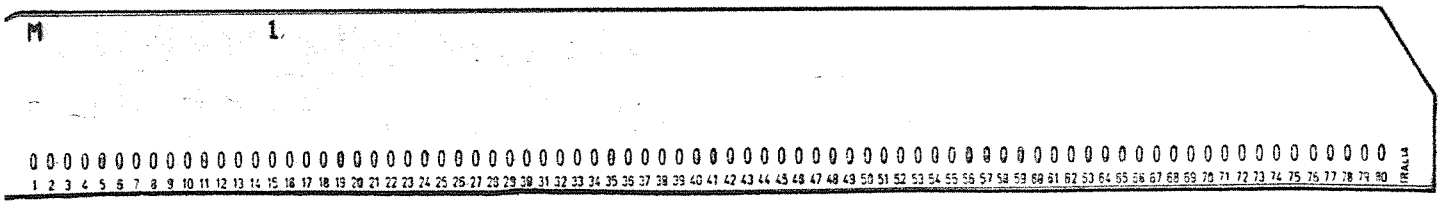












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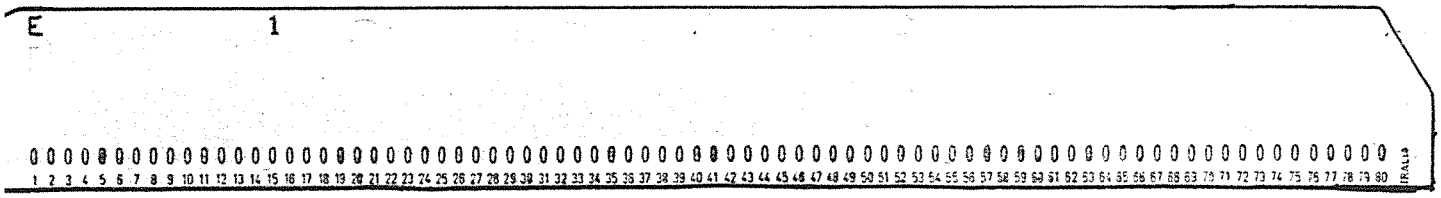

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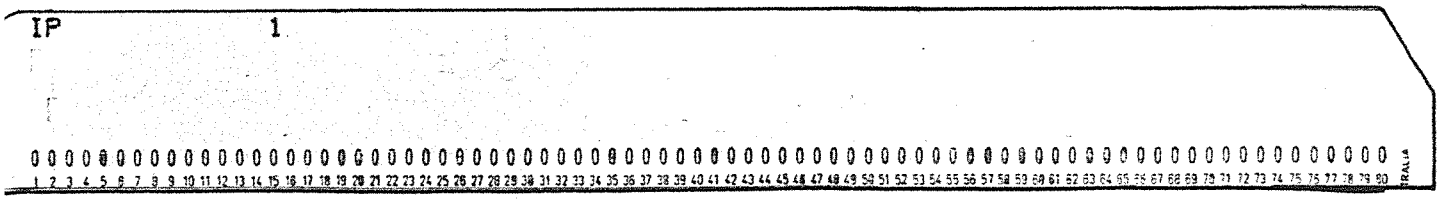

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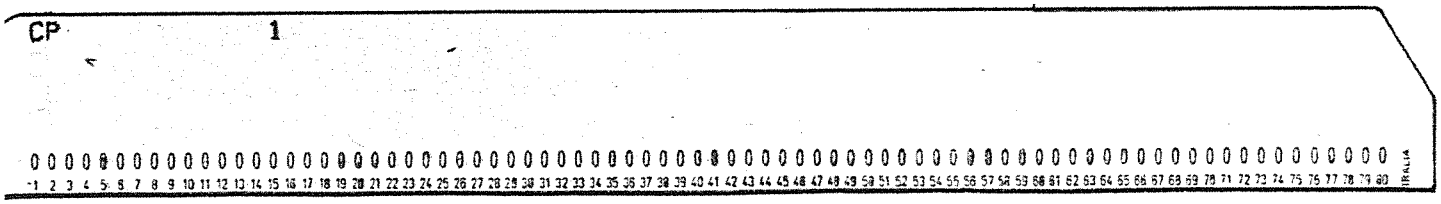

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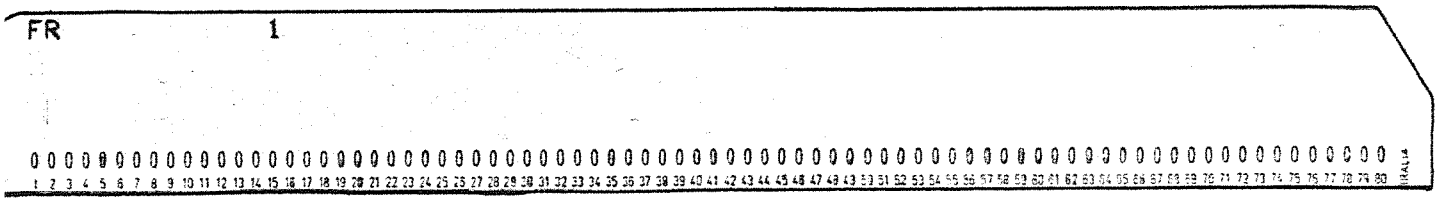

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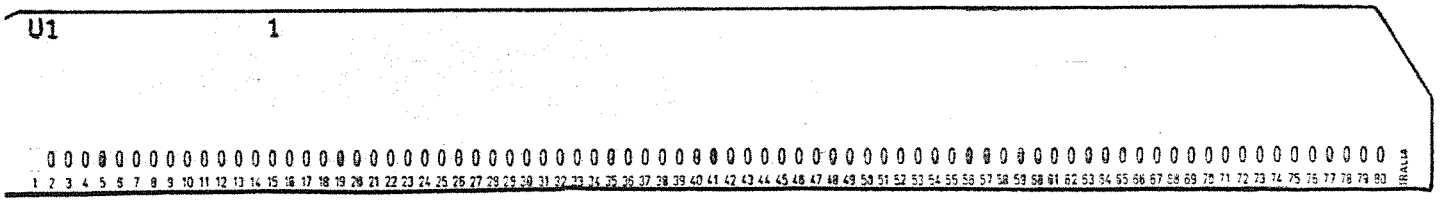

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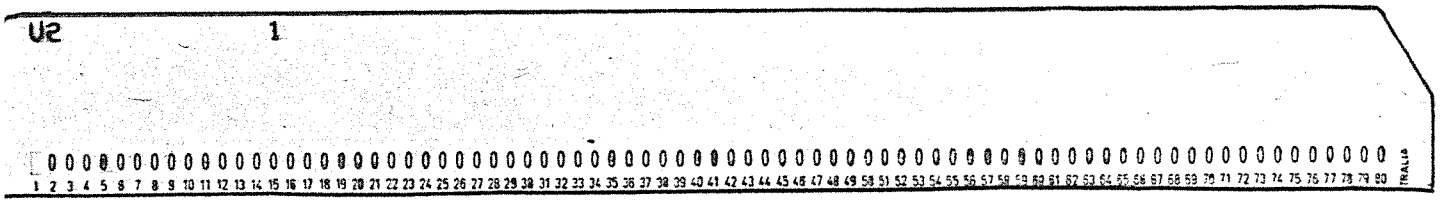

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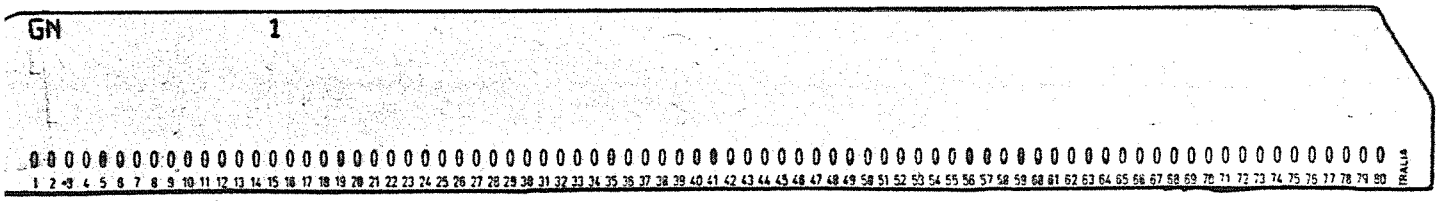
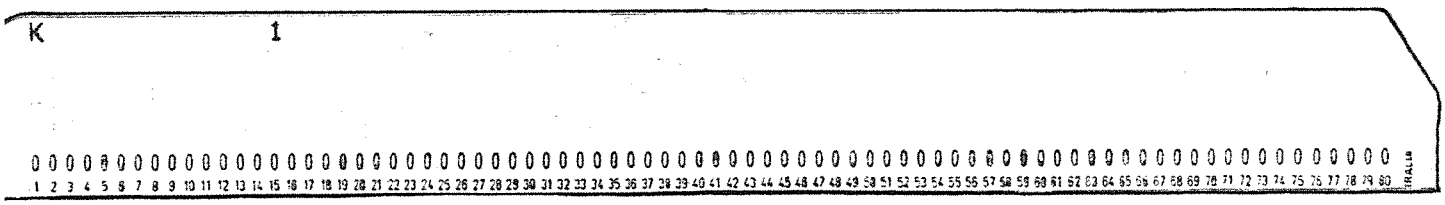


28



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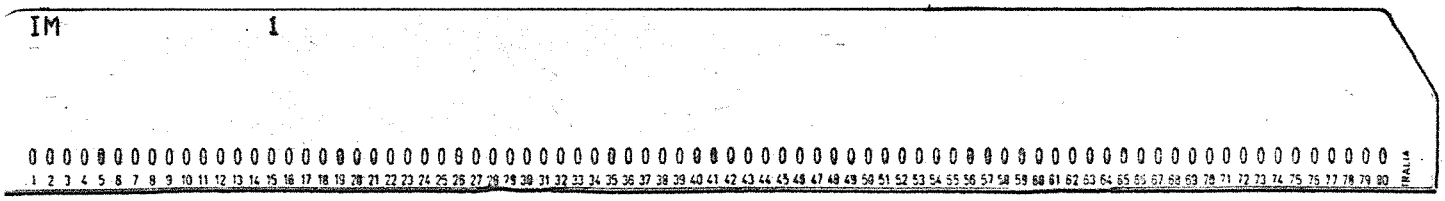

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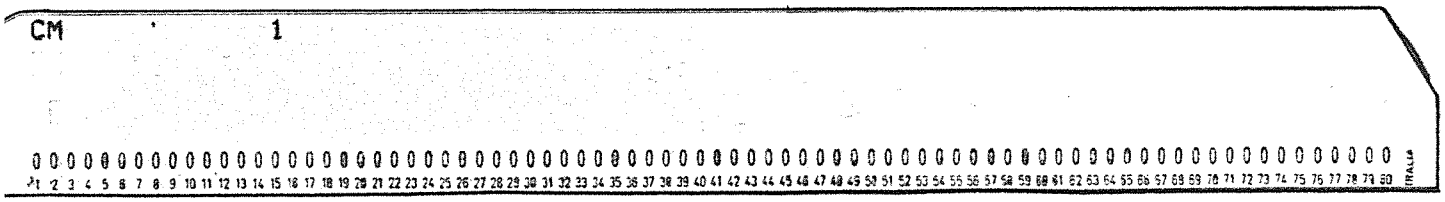

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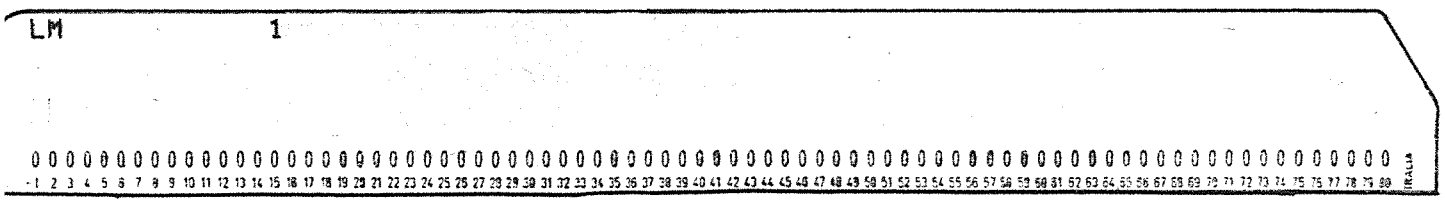

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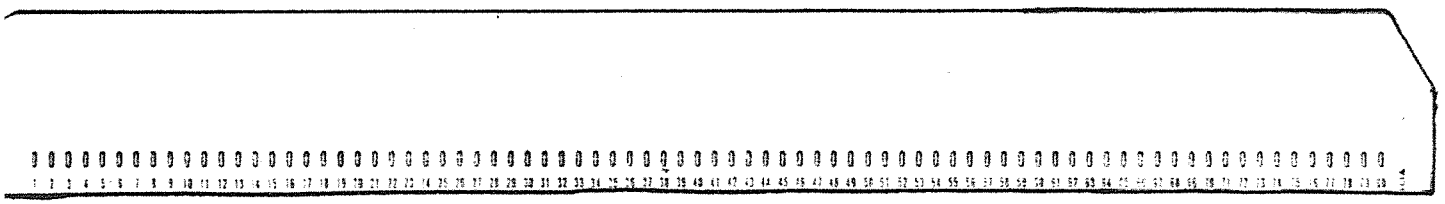
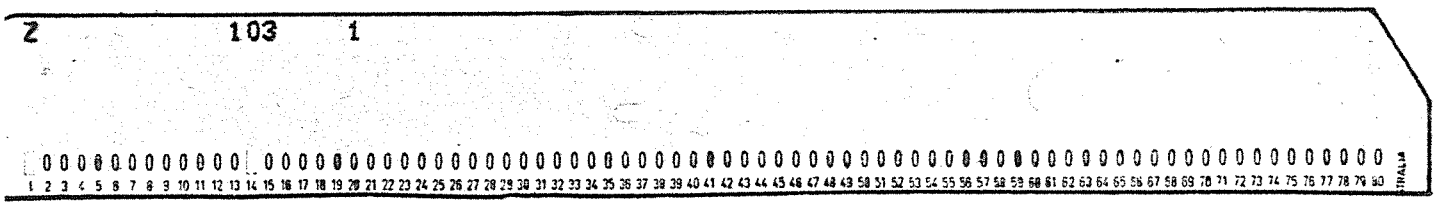
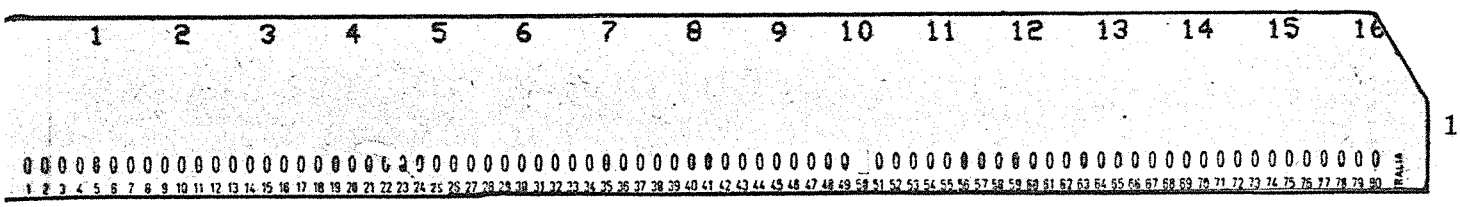


33

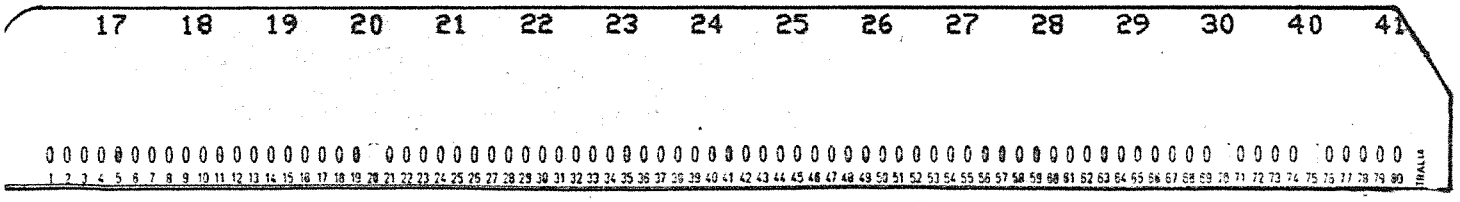
[To illustrate the procedure for partly endogenous vector variables, imagine that you wished to conduct an experiment in which the outputs of the highly protected textile (31-37), clothing (38), footwear (39) and motor vehicles (68) industries were declared exogenous. To list the endogenous components (i.e. 1-30, 40-67 and 69-113) individually you would have to replace card 14 in the illustrative deck with cards 14(a) and 14(b1) - 14(b7).]

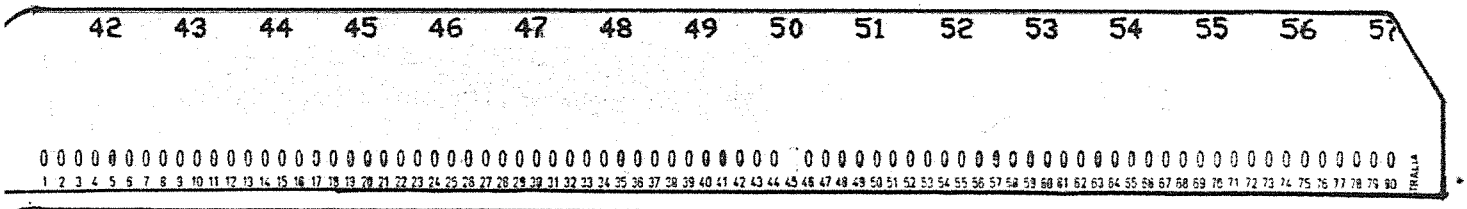


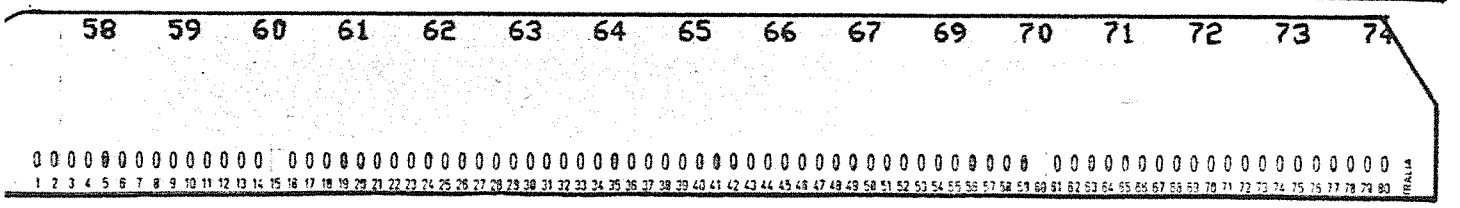
14(a)

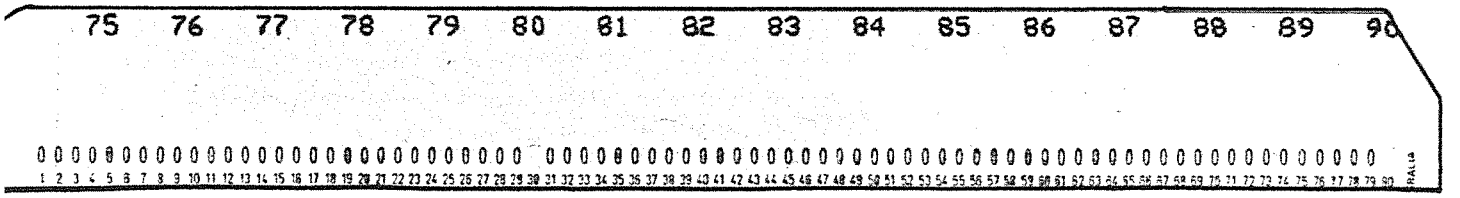


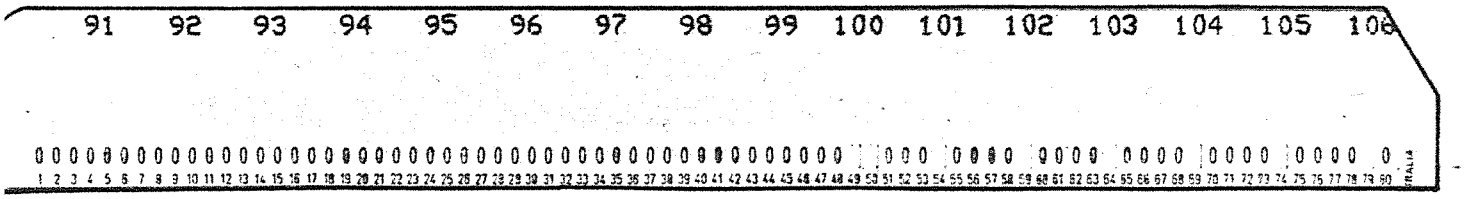
14(b1)

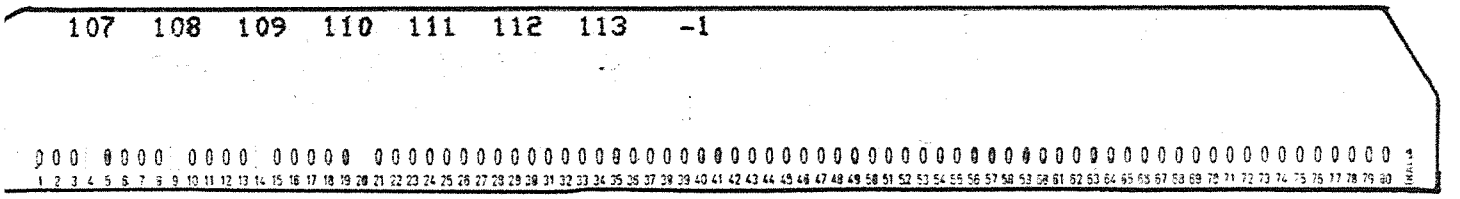




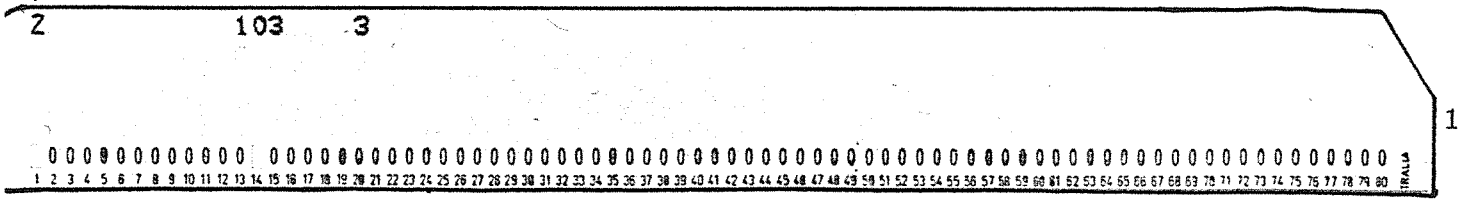


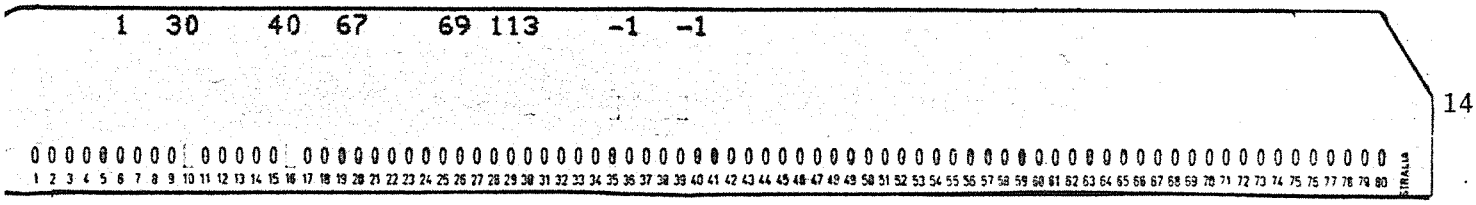






[To enter the same components in blocks you would require cards 14(a)* and 14(c).]

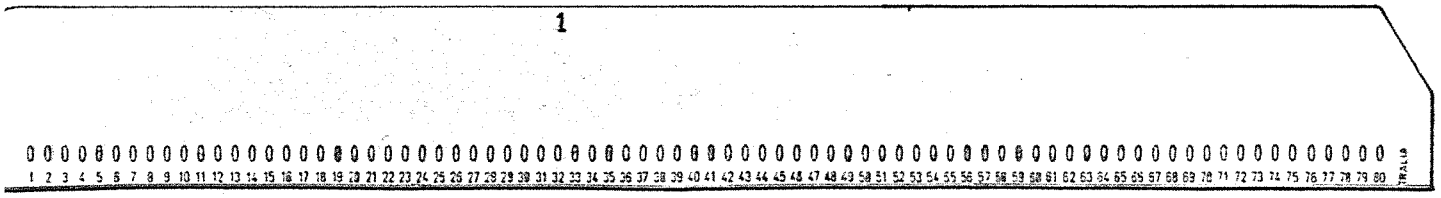




III.2.3 : The exogenous-variables card

This card specifies which of the exogenous variables in your experiment are to have non-zero values. *You must punch "1" in the column corresponding to the code number (given in Table III.2) of each vector variable which is to contain any non-zero exogenous components.*

[In our illustrative experiment only the occupation-specific wage shift variables (i.e., vector variable 32 in Table III.2) are to be given non-zero values (see Table II.1). Hence the exogenous-variable card (34) in our deck has "1" in column 32.]



III.2.4 : Cards for indexation, export commodities, exogenous investment, exogenous imports, and various other parameters

The next sequence of cards specifies details of the following eleven aspects of your experiment. All of these have been determined for our illustrative simulation either in Table II.1 or in the standard ORANI data base.

(i) the extent of wage indexation (i.e., values for the parameters $h^{(1)}_{(\tilde{g}+1,1,m)j}$),

(ii) the endogenous-export commodities,

(iii) the exogenous-investment industries,

(iv) exogenous imports,

(v) export demand parameters (γ_i),

(vi) investment parameters (β_j and G_j),

(vii) investment parameters (Q_j),

(viii) indexation of "other costs" (i.e., values for the $h^{(1)}_{g+2,j}$),

(ix) the relationship between exogenous and endogenous investment levels (i.e., values for the $h_j^{(2)}$),

(x) indexation of "other" final demand for domestic goods (i.e., values for the $h_{(i1)}^{(5)}$),

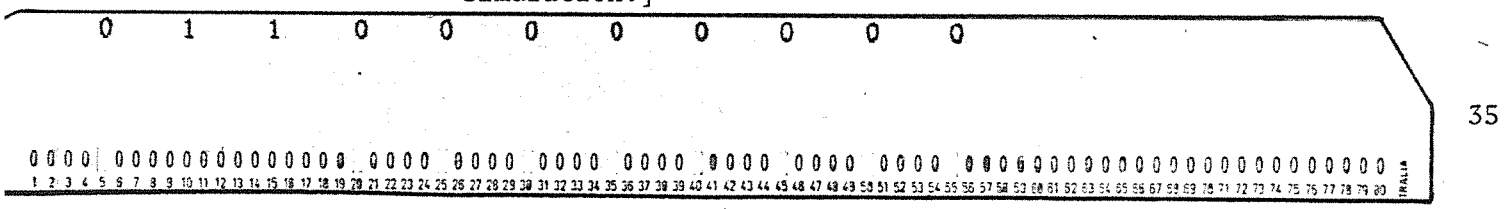
(xi) indexation of "other" final demand for imports (i.e., values for the $h_{(i2)}^{(5)}$).

III.2.4.1 Sequence control card

The first card in the sequence controls the remaining cards. *You must punch on it either "0" or "1" for each of items (i) - (xi) above. These must be entered in the order given above and must be in format* 11I5 [1].

- "0" indicates that the default value for the item will be used. No additional cards for the item are then required in this sequence
- "1" indicates that user-specified choices will be made for that item with details entered on subsequent cards (see below).

[Card 35 is the appropriate card for our illustrative simulation.]



The default values are compulsory for items (iv) - (vii) and (ix) - (xi). Hence *you must punch "0" in columns 20, 25, 30, 35, 45, 50 and 55 on the sequence control card.* These set all imports endogenous, give the export demand and investment parameters from the standard ORANI data base, index the level of investment in each exogenous-investment

1. See Appendix, subsection A.1.

industry to aggregate private investment, and fully index "other" final demand levels to aggregate consumption.

No default values are available for items (ii) and (iii). Hence *you must punch "1" in columns 10 and 15 on the sequence control card.*

Optional default values are available for items (i) and (viii). Hence *you may punch "0" or "1" in columns 5 and 40 on the sequence control card.* The default values are: for item (i) 100 per cent indexation of all wage rates to the ORANI consumer price index (CPI) (i.e., $h^{(1)}_{(g+1,1,m)j}=1$ for all m and j); and for item (viii) full indexation of the price of "other costs" to the CPI (i.e., $h^{(1)}_{g+2,j}=1$ for all j).

When you punch "1" for an item on the sequence control card, additional cards containing details of the relevant user-specified choices are required in the sequence.

Proceed as follows.

III.2.4.2 Wage indexation cards

If "1" is punched in column 5 of the sequence control card (III.2.4.1) the next card or cards in the sequence must specify the wage-indexation assumptions which you require. Three options are available:

(a) uniform indexation at a rate other than 100 per cent (i.e., $h^{(1)}_{(g+1,1,m)j} = h^{(1)}_{(g+1,1)} \neq 1$ for all m and j)

(b) occupation-specific indexation (i.e., $h^{(1)}_{(g+1,1,m)j} = h^{(1)}_{(g+1,1,m)}$ for all j)

(c) individual settings for up to 112 of the $h^{(1)}_{(g+1,1,m)j}$ with either option (a) or (b) for the remaining $h^{(1)}_{(g+1,1,m)j}$.

Punch a card in format F10.3,2I5 [1] *to indicate which of the three options you require*

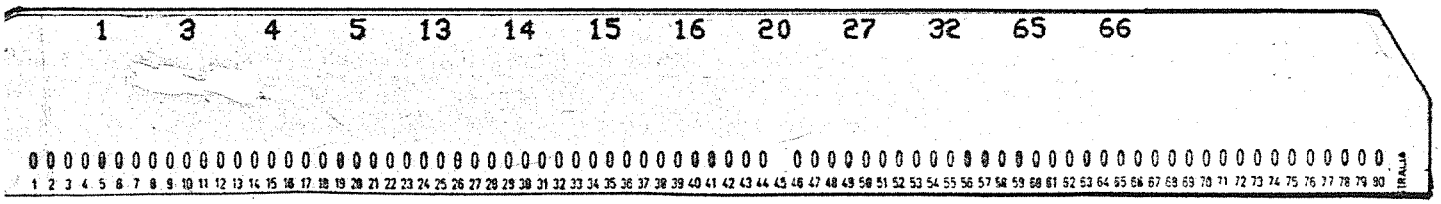
- for option (a) punch the uniform wage-indexation factor ending in column 10 (e.g. for 75% indexation punch 0.75 - include the decimal point)
- for option (b) punch "1" in column 15 and include a second card containing nine occupation-specific indexation factors in format 9F5.3 [2]
- for option (c) punch the requirements for either option (a) or (b) for the non-individual settings, as instructed above; then punch, ending in column 20, the total number of occupation and industry-specific indexation factors which are to be set individually; and include additional card(s) on which are punched details of the individually set factors, [4] Punch sets of industry number, [3] occupation number and indexation factor in format 8(I3, I2, F5.3). [5]

[For our illustrative experiment wages are fully indexed, hence we have punched "0" in column 5 of card 35]

III.2.4.3 Endogenous-export cards

Recall that it is compulsory to punch "1" in column 10 of the sequence control card (III.2.4.1, see p.35 above). Therefore the next card (or cards) in the sequence must contain the identification numbers (see Table III.3) of the endogenous-export commodities in your experiment. These must be punched in format 16I5. [6]

[For our illustrative experiment, with the export commodities listed in Table II.1, card 36 is required.]



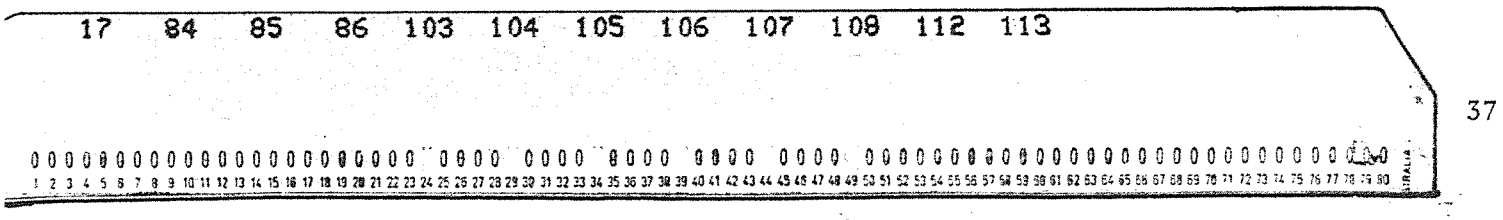
36

1. See Appendix, subsection A.4.
2. See Appendix, subsection A.5.
3. See Table III.3.
4. See Table III.4.
5. See Appendix, subsection A.6.
6. See Appendix, subsection A.1.

III.2.4.4 Exogenous-investment cards

Recall that it is compulsory to punch "1" in column 15 of the sequence control card (III.2.4.1, see p 35). Therefore the next card (or cards) in the sequence must contain indentification numbers of the exogenous-investment industries (see Table III.3). The format 16I5 [1] is the same as that used for the export commodity card(s) (III.2.4.3, above).

[The appropriate card for the illustrative experiment is card 37.]



37

III.2.4.5 "Other cost" indexation cards

If "1" is punched in column 40 of the sequence-control card (III.2.4.1) the next card (or cards) in the sequence should list, in format 8(I4,F6.4), [3] values for the indexing factors $(h^{(1)}_{g+2,j})$ for all industries for which the default option (i.e., full indexation to the CPI) is to be overwritten. Punch the industry identification number (see Table III.3) and its indexation factor in each field of 10 columns.

[For our illustrative experiment the default option was selected on card 35. Hence no additional "other cost" indexation cards are required.]

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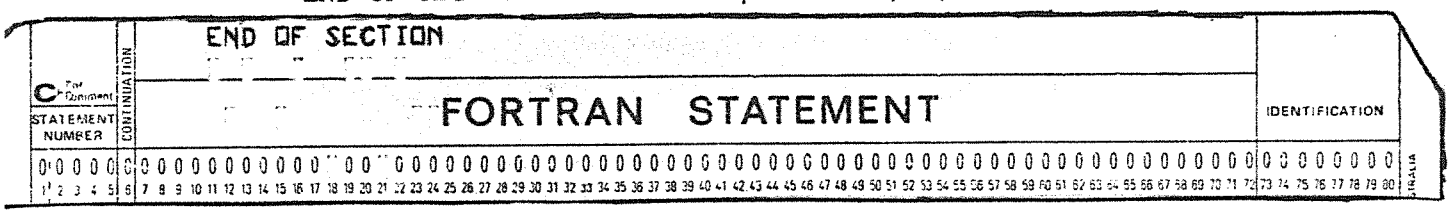
1. See Appendix, subsection A.1.
2. See Appendix, subsection A.1.
3. See Appendix, subsection A.7.

III.2.5 End of section

Conclude the basic-solution section of the deck with a (blue)

"END OF SECTION" *card multi-punched 7, 8, 9 in column 1* [e.g., card 38].



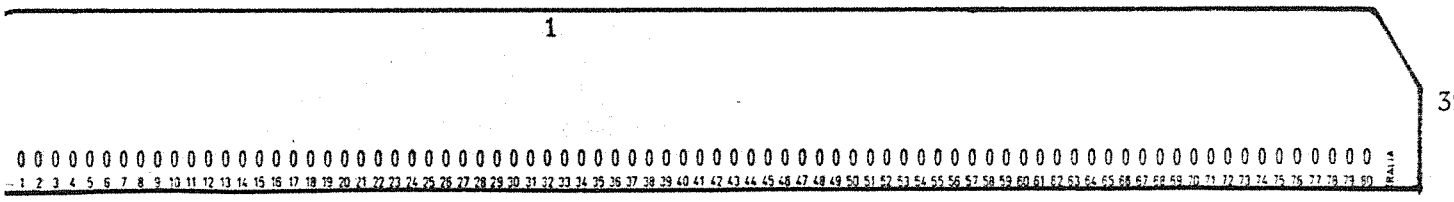
38

III.3 Specifying the back solutions

III.3.1 Non-zero exogenous variables card

On the first card in this section of the deck specify all non-zero exogenous variables. The card is identical to the exogenous-variable card in the basic-solution section of the deck (see sub-section III.2.3):

[For the illustrative experiment it is card 39, identical to card 34]



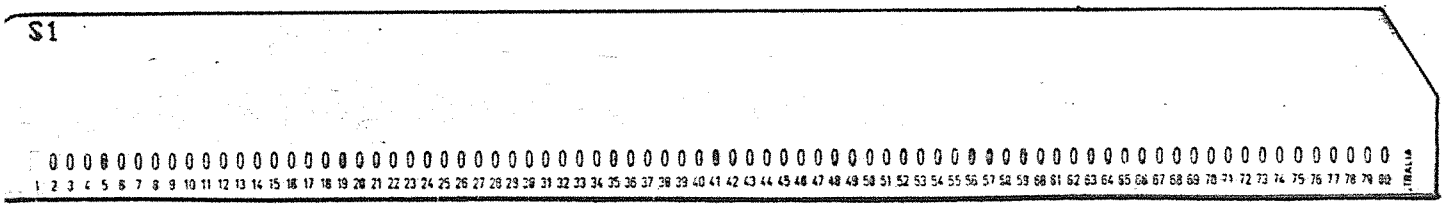
39

III.3.2 Endogenous variables for which back solutions are required

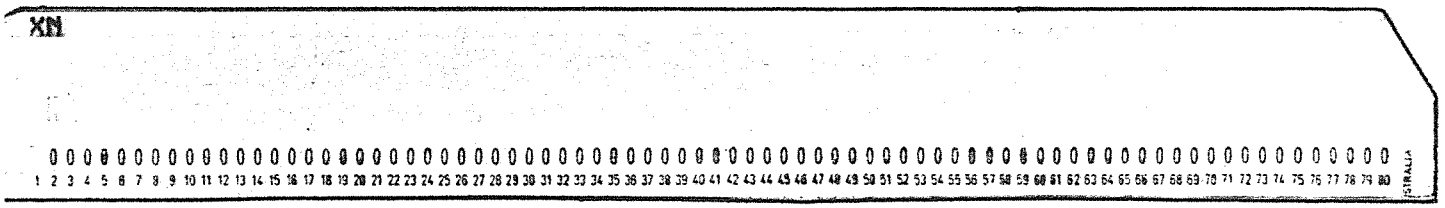
Table III.2 part B lists all vector variables for which back solutions are currently available in the ORANI programs. *You must include in the deck one card for each of the vector variables for which you require a back solution to be computed. On each card you must punch, (in format A2[1], starting in column 1) the computer mnemonic for the relevent vector variable (see Table III.2). The cards must be entered in the order in which the variables appear in the table.*

1. See Appendix, subsection A.8.

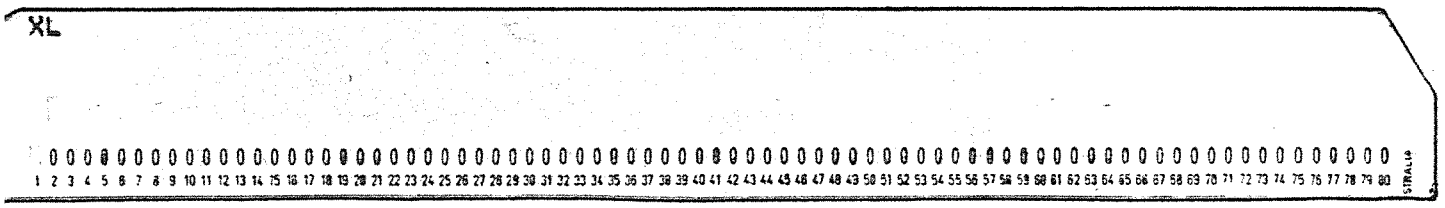
[For the illustrative experiment we require all available back solutions. Hence the following 13 cards (cards 40 - 52) are required.]



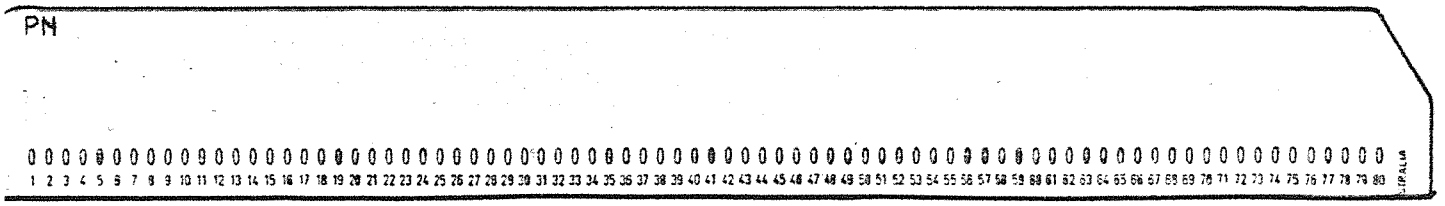
40



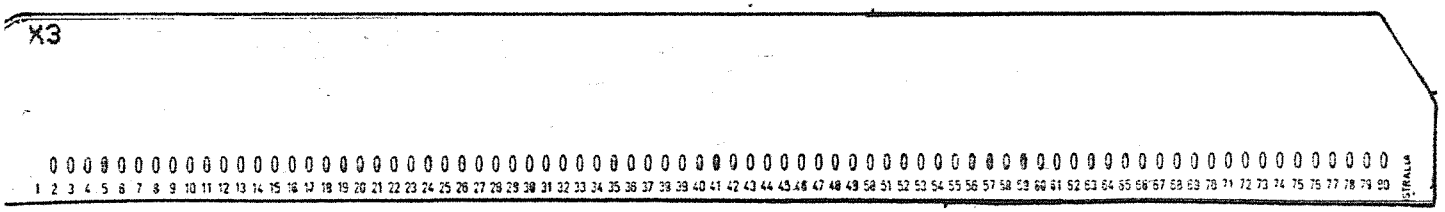
41



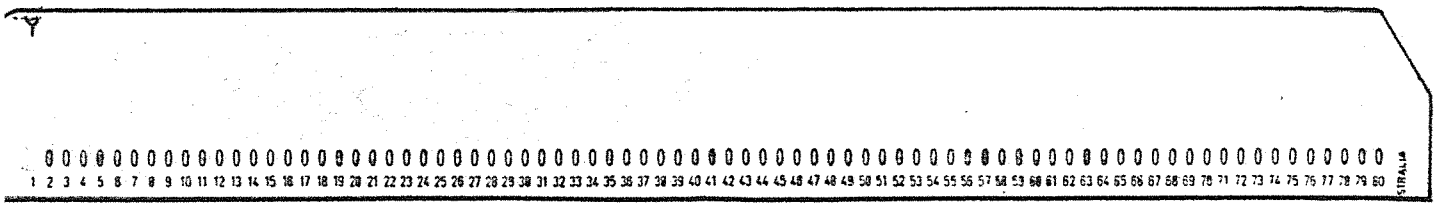
42



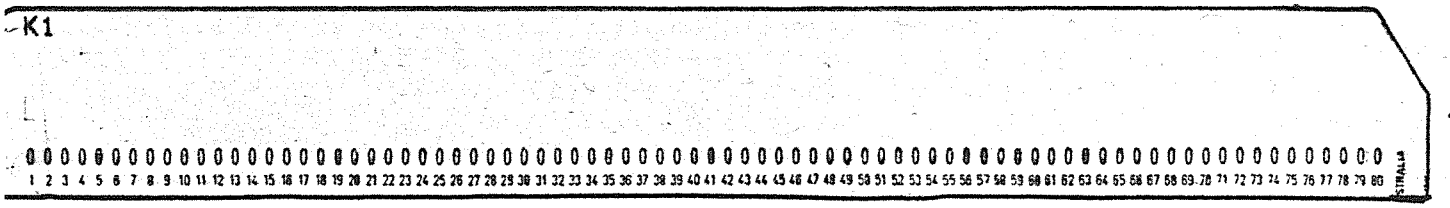
43



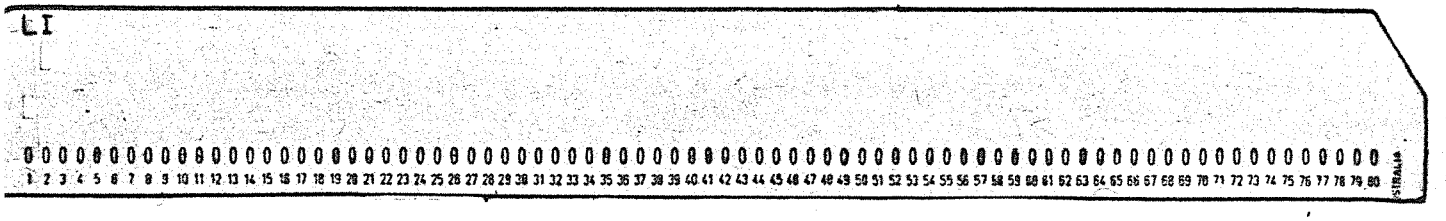
44



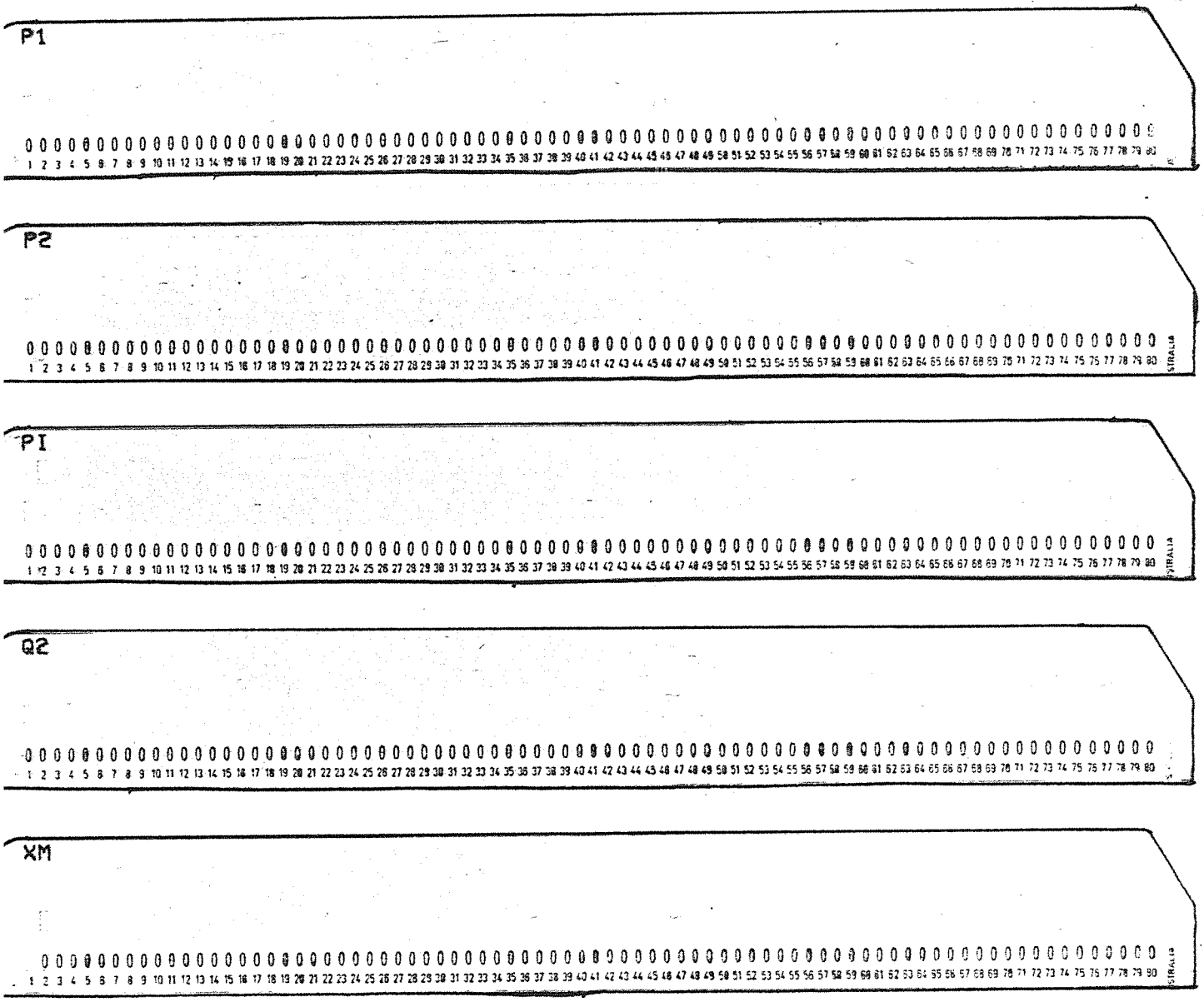
45



46



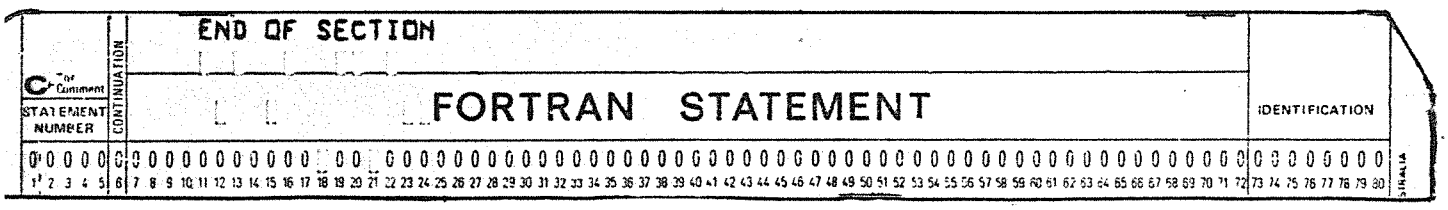
47



III.3.3 End of section

Conclude the back-solution section of the deck with a (blue)

"END OF-SECTION" *card multi-punched 7, 8, 9 in column 1* [*e.g., card 53*].



III.4 Specifying the printout

III.4.1 Printout steering card

The first card in the printout section of the deck contains 20 pieces of information punched in format I3,2X, 14I3,23X,5I2:[1]

(a) *In columns 1-3 ending in column 3; punch the total number of non-zero exogenous components of the exogenous vector variables in your experiment*

(b) *Punch in columns 6-47 the number of components for which solution values are required of each of 14 classes of endogenous variables. For each class: leave three blank columns if no solution values are required for that class in your printout; punch the number of components required if it is less than the entire class; punch "999" if all components of the class are required.*

- The first of the 14 classes (i.e., the class entered in columns 6-8) is the *endogenous variables from the final ORANI system.* (The total number of components is 273, see p.27 above.)

- The remaining 13 of the 14 classes (columns 9 - 47) are the *vector variables obtained by back-solution.* You must enter these in the order in which they are listed in Table III.2, part B.

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1. See Appendix, subsection A.9.

(c) In columns 71-72 you must indicate whether you want your printout to include separate columns of the solution matrix showing the effects on the selected endogenous variables of each of the non-zero exogenous variables, or just a single column giving the sum of the effects of all the exogenous changes (i.e., the row totals of the solution matrix)

- *punch "0" in column 72 if you want the whole matrix including row totals*
- *punch "1" in column 72 if you want only the row totals of the solution matrix.*

(d) Columns 73-74 are important only for simulations in which exogenous tariff changes are made. *If there are to be no exogenous tariff changes leave these columns blank.* The ORANI 78 computer programs assume that tariff rates are specified as ad valorem (c.f., the values for the user-specified parameters $h_j(i2,0)$ (j = 1-3) in Table II.1)

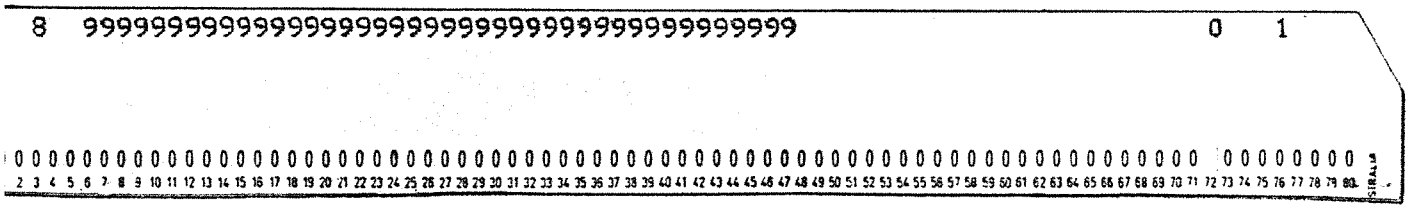
- *punch "-1" in columns 73-74 if you wish to use the set of tariff rates in the standard ORANI data base* (see DPSV, Table 45.4 and subsection 45.2(a)).
- *punch "1" in column 74 if you wish to supply your own set of tariff rates.* These rates must then be specified later in the card sequence (see subsection III.4.3 below).

(e) *Punch "1" in column 76 if you wish to print a title at the top of each page of your printout.* A title card must then be included (see subsection III.4.2 below).

(f) in *columns 77-78, ending in column 78, specify the number of decimal places* required in your printout. The maximum number available is six. A blank here gives 4 decimal places.

(g) *Punch "30" in columns 79-80 if you wish your printed results to be stored on a file in the computer.* (You should store your results in this way if you think that you may wish to process them in the computer at some future time. For example, you might decide, after looking at the results, that some of them should be aggregated for presentation. If the results are stored you could then use a separate program to perform the aggregation. Note that in the current version of the program, Tape 30 only has the capacity to store results for up to 115 exogenous (scalar) variables.)

[For our illustrative experiment the appropriate printout steering card is card 54.

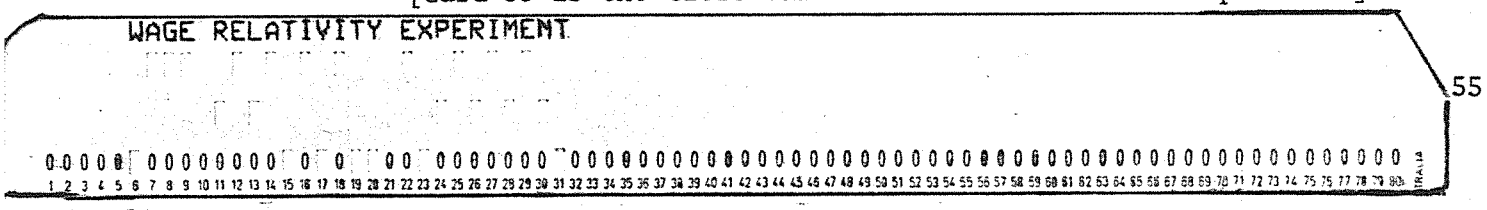


It indicates (column 3) that there are 8 non-zero, scalar exogenous variables in the experiment (i.e., the wage shifts for occupations 1-8); it demands (columns 6-47) printed solutions for all final-system and back-solution endogenous variables; it requires (column 72) columns of the solution matrix for each non-zero exogenous variable to be printed as well as the row totals; and it signals (column 76) the inclusion of a title card.]

III.4.2 Title card

If "1" has been punched in column 76 of the printout steering card (see subsection III.4.1(e)) include a card with your printout title punched within the first 50 columns.

[Card 55 is the title card for our illustrative experiment]



III.4.3 Tariff-rate cards

If "1" has been punched in column 74 of the printout steering card (see subsection III.4.1(d)), include cards containing 115 ad valorem tariff rates punched as proportions, not percentages, in format 10F5.2[1]. Follow with a blank card.

III.4.4 The exogenous variables

For each non-zero exogenous vector variable (in the order of vector variables given in Table III.2) punch

(a) *a master card in format A2, 8X, 3I5*[2] *containing*

- the mnemonic for the vector (see Table III.2) (cols 1-2, starting in column 1)
- the number of non-zero exogenous components (cols 11-15, ending in column 15)
- first command number (cols 16-20)
  - leave these columns blank if all components of the vector are to be given non-zero exogenous values
  - punch "1" in column 20 if the identification numbers of the non-zero exogenous components are to be specified one at a time. Then specify them as in (b) below
  - if the identification numbers of the exogenous components are to be specified in blocks, punch the number of such blocks (not "1" or "0") in column 20. Then specify them as in (b) below.

---

1. See Appendix, subsection A.5.
2. See Appendix, subsection A.2

- second command number (cols 21-25)

  - punch "0" in column 25 if the value for all non-zero exogenous components is 1, i.e., if you require the solution matrix to be a matrix of elasticities.

  - punch "1" in column 25 if all non-zero exogenous components are to take the same value (not 1). Then specify this value as in (c) below.

  - punch "2" in column 25 if the non-zero exogenous components are to have different values. Then specify the values as in (c) below.

(b) *the identification numbers of the exogenous components*[1] (N.B. not required if columns 16-20 of the master card were left blank)

- if "1" was punched in column 20 of the master card (see III.4.4.(a) above) punch the identification numbers (in ascending order) of the non-zero exogenous components in format 16I5.[2] Conclude with a dummy component "ΛΛΛ-1".

- if a number "n" (n>1) was punched in column 20 of the master card (see III.4.4.(a) above), the identification numbers of the non-zero exogenous components are to be entered in n blocks. Punch the numbers of first and last components of each block in format 8(2X,2I4).[3] Conclude with a dummy set "ΛΛΛΛ-1ΛΛ-1".

(c) *the values for the non-zero exogenous components*. (N.B. not required if "0" was punched in column 25 of the master card).

- if "1" was punched in column 25 of the master card (see III.4.4.(a) above), punch a card containing the single value for the non-zero exogenous components in format F10.4.[4]

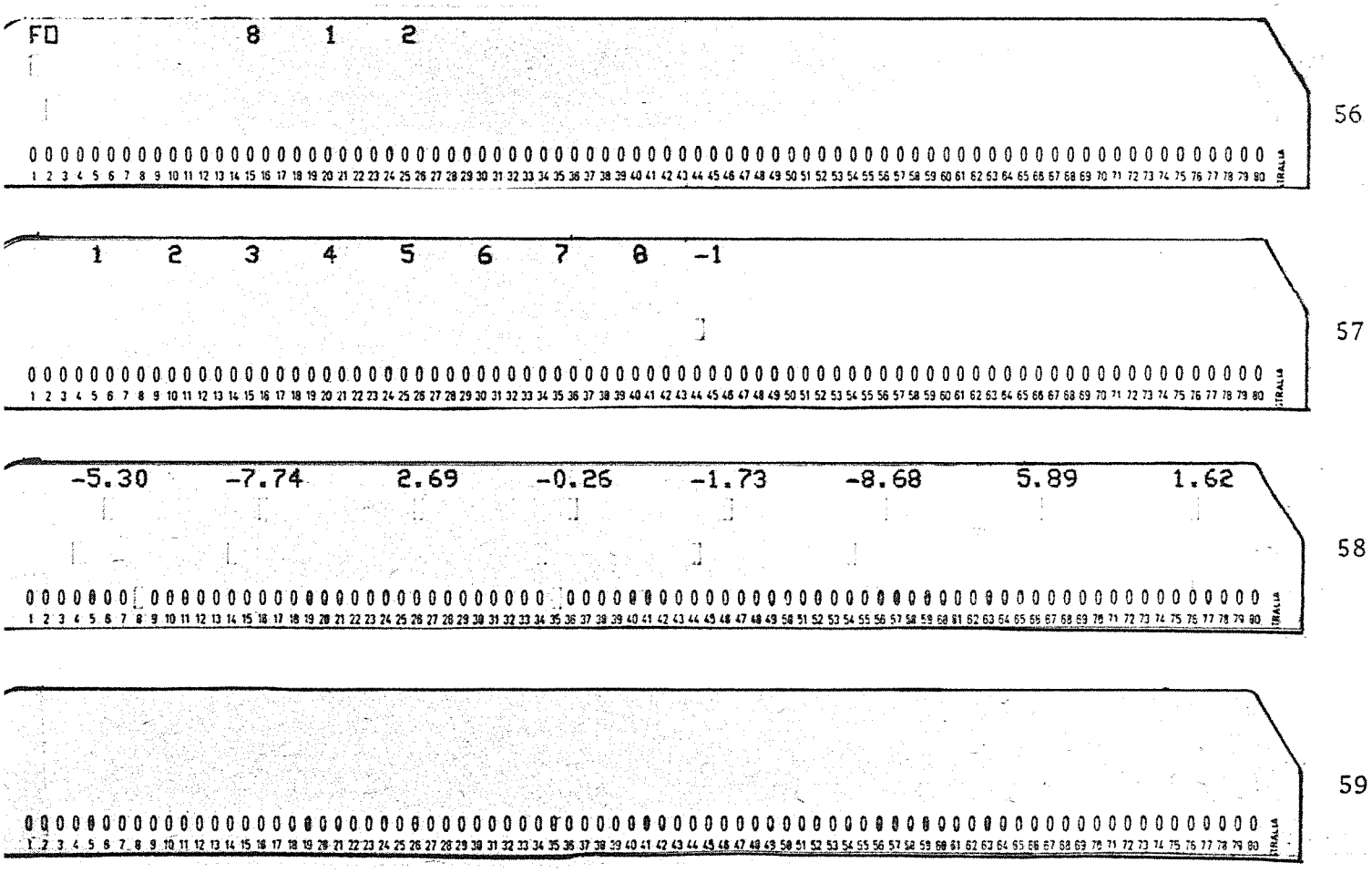
---

1. Note that the procedures for specifying the exogenous components here are very similar to the procedures for specifying the endogenous variables in the basic-solution section of the deck (see subsection III.2.2).
2. See Appendix, subsection A.1.
3. See Appendix, subsection A.3.
4. See Appendix, subsection A.5.

- if "2" was punched in column 25 of the master card (see III.4.4.(a) above), punch a card or cards containing values for the individual non-zero exogenous components in format 8F10.4 [1]

Conclude the exogenous-variable cards with a blank card.

[The exogenous-variable block for the illustrative experiment contains 4 cards (56-59). There is only one non-zero exogenous variable (shift term for occupational wage rates, whose mnemonic is FØ) in the experiment. Card 56 is the master card. Eight components are exogenous, hence there is an "8" in column 15, and a "1" in column 20. The identification numbers of the non-zero exogenous components of FØ are listed on card 57. The values for the non-zero exogenous components are set individually, hence column 25 of card 56 contains a "2". Card 58 contains 8 values for the exogenous components. Card 59 is the concluding blank.]



1. See Appendix, subsection A.5.

III.4.5 The endogenous variables

If on the printout steering card (see III.4.1(b) above) you have specified that solution values for some, but not all, components of a class of endogenous vector variables are to be printed (i.e., if you have punched some number other than 0 or 999 for the endogenous vector in columns 6-47 of the steering card) *you must include for each such vector the following card(s)*

(a) *a master card* (format A2,8X,215) [1] containing

- the mnemonic for the vector variable (see Table III.2) in cols 1-2, (starting in column 1)
- the number of endogenous components to be printed (cols 11-15 , ending in column 15)
- first command number (cols 16-20)
  - "1" in column 20 indicates that the identification numbers of the endogenous components are to be specified individually as in III.4.5 (b)
  - a number "n" (n>1) in column 20 indicates that the identification numbers of the endogenous components are to be specified in n blocks as described in III.4.5(b).

(b) *a card or cards containing the identification numbers of the endogenous components which are to be printed.* [2]

- if "1" was punched in column 20 of the master card (see III.4.5 (a) above), punch the identification numbers of the endogenous components individually in ascending order in format 16I5. [3] Conclude with a dummy component "∧∧∧-1".

---

1. See Appendix, subsection A.2.
2. Note that this procedure is similar to that used to specify endogenous variables for the basic-solution (see subsection III.2.2).
3. See Appendix, subsection A.1.

- if n>1 was punched in column 20 of the master card (see III.4.5 (a) above), punch the identification numbers of the first and last endogenous components of each of the n blocks in which the identification numbers of the endogenous components are to be entered (format 8(2X,2I4)).[1] Conclude with a dummy set "ΛΛΛΛ-1ΛΛ-1".

Conclude the endogenous-variable cards with a blank card.

[Note that "999" was punched for all the endogenous vector variables on the printout steering card (54) for the illustrative experiment. Hence the printout sequence in our deck requires no endogenous-variable cards.]

Conclude the printout section of the deck with a blank card.

[Our illustrative deck requires this blank card. It is card 60.]

60

III.5 End of information

The deck concludes with a (yellow) "END OF INFORMATION" *card multi-punched 6, 7, 8, 9 in column 1*

[This final card in our illustrative deck is card 61]

61

END OF INFORMATION

FORTRAN STATEMENT

1. See Appendix, subsection A.3.

IV. Interpreting the Printout

This section contains some brief notes to explain the form of the printout for a standard ORANI 78 simulation. An abridged version of the printout for the illustrative simulation is given in Figure IV.1. You can identify your job by the first line of the printout. It contains the node identifier (entered on card 1 of the illustrative deck; see subsection III.1), your user identification code (entered on card 2), and your program name (entered on card 3).

The first section of the printout (see Figure IV.1 pages 51-56) documents the progress of your job in the computer. We shall not describe this in detail. Just note that control cards 3-11 are reproduced as part of the documentation (we have underlined these in Figure IV.1). This section will contain valuable error messages in the event that your job fails. Consult your node manager if your job is unsuccessful. Information on the time taken by the computer to run your job and on the bulk of the computing costs are also printed out in this section (see Figure IV.1 page 56).

If you included control card 8 in your deck (see subsection III.1), section 2 of your printout will contain more diagnostics, labelled "SCOPE 2 LOAD MAP" at the top of each page. For the illustrative simulation this section consisted of about 50 pages; however, to conserve space, all except the first page have been ommitted from Figure IV.1 (see Figure IV.1 page 57).

The third section of the printout reproduces the assigned values for the non-zero exogenous variables. Thus for our illustrative wage relativity simulation, the non-zero shifts we imposed on the

```
 1727  LP  2353  MK DIAXPH LABDR       LPMK PR 1P       2348 23/07/81 MEC 7777777777777777777777777777777777777777777777777777777777777

** 7090 SCOPE 2.1.5=533 MOD 21/07/81  13.58.42.** 23/07/81       81204

          CYBERFLASH NO. 133. = 26/06/81  09.13.50 = CHARGE INCREASES

HH.MM.SS CPU SECOND ORIGIN
          23.36.27 RIO,      JOB INPUT VIA CSIRO RIO76.
          23.36.27 RIO,      FILE INPUT CHARGE    $0.30
                             =LABDR.MS140000.ML300.P0000.T1000.
23.36.28 00000.005 CYJ,      OPERATOR INITIATED
23.36.28 00000.007 CYJ,      -GETSET,DTB2344.
23.36.28 00000.007 LOD,        RP223 = MNTMACRO=  MOUNT  = SN=DTB2344          VSN=
23.36.28 00000.010 CYJ,        SET PARAMETERS SUBSTITUTED
23.36.28 00000.012 CYJ,        RP320 =  EST   5  ASSIGNED
23.36.28 00000.013 CYJ,        RP570 = VSN ADUN05 OF SET EMUS05  MOUNTED
23.36.28 00000.036 CYJ,      -GETSET,DTB3006.
23.36.28 00000.037 LOD,        RP223 = MNTMACRO=  MOUNT  = SN=DTB3006          VSN=
23.36.28 00000.038 CYJ,        SET PARAMETERS SUBSTITUTED
23.36.28 00000.040 CYJ,        RP320 =  EST   6  ASSIGNED
23.36.28 00000.041 CYJ,        RP570 = VSN ADUN06 OF SET EMUS06  MOUNTED
23.36.28 00000.064 CYJ,      =MAP(ON)
23.36.28 00000.065 JOB,      =ATTACH,CCL,OMORANI78CCLLIB,ID=DIAXOM,SN=DTB3006,PW=******.
23.36.28 00000.066 JOB,        PF254 = CYCLE    8 ATTACHED FROM SN=EMUS06
23.36.28 00000.070 CYJ,      =LIBRARY,CCL,*.
23.36.28 00000.070 JOB,        RP727 = VSN ADUN06 OF SET EMUS06  MOUNTED
23.36.28 00000.071 CYJ,      =SOLRUN,PHWRP,DIAXPH,COMMON,LABTK,LABXR,ORANTK,ORANTK,ORANTK,ORANTK.
23.36.29 00000.074 LOD,      =COMMENT.
23.36.29 00000.112 JOB,      =COMMENT, *** B E G I N  S O L U T I O N ***
23.36.29 00000.112 JOB,      =COMMENT.
23.36.29 00000.113 JOB,      =TABRUN,PHWRP,DIAXPH,COMMON,LABTK,LABXR,ORANTK,ORANTK,ORANTK,ORANTK,OM78STD,
23.36.29 00000.114 LOD,      =DIAXOM,DTB3006.
23.36.29 00000.122 JOB,      =OM78STD,DIAXOM,DTB3006,OM78STD,DIAXOM,DTB3006,OM78STD,DIAXOM,DTB3006,10,DIAXOM.
23.36.29 00000.122 JOB,      =DTB3006.
23.36.29 00000.183 JOB,      =COMMENT.
23.36.29 00000.172 JOB,      =COMMENT, *** B E G I N  T A B L O ***
23.36.29 00000.172 JOB,      =COMMENT.
23.36.29 00000.173 JOB,      -GETSET,DTB2344.
23.36.29 00000.174 LOD,        RP223 = MNTMACRO=  MOUNT  = SN=DTB2344          VSN=
23.36.29 00000.177 CYJ,        SET PARAMETERS SUBSTITUTED
23.36.29 00000.179 CYJ,        RP1034= VSN ADUN05 OF SET EMUS05  MOUNTED
23.36.29 00000.180 CYJ,      -GETSET,DTB3006.
23.36.29 00000.180 LOD,        RP223 = MNTMACRO=  MOUNT  = SN=DTB3006          VSN=
23.36.29 00000.184 CYJ,        SET PARAMETERS SUBSTITUTED
23.36.29 00000.186 CYJ,        RP1034= VSN ADUN06 OF SET EMUS06  MOUNTED
23.36.29 00000.186 CYJ,      =COMMON.
23.36.29 00000.187 LOD,      -GETSET,COMMON.
23.36.30 00000.216 LOD,        RP223 = MNTMACRO=  MOUNT  = SN=COMMON           VSN=
23.36.30 00000.220 CYJ,        SET PARAMETERS SUBSTITUTED
23.36.30 00000.222 CYJ,        RP1034= VSN ADUN20 OF SET COMMON  MOUNTED
23.36.30 00000.223 CYJ,      =REVERT,CCL
23.36.30 00000.223 LOD,      =ATTACH,OM78LIB,OMORANI78LIB,ID=DIAXOM,SN=DTB3006,MR=1.
23.36.30 00000.237 JOB,        PF254 = CYCLE    2 ATTACHED FROM SN=EMU806
23.36.30 00000.241 CYJ,      =ATTACH,TAPE16,OM78STDPRICE,ID=DIAXOM,SN=DTB3006,MR=1,PW=******.
23.36.30 00000.242 JOB,        PF254 = CYCLE    1 ATTACHED FROM SN=EMUS06
23.36.30 00000.246 CYJ,      =ATTACH,TAPE17,OM78STDXX2,ID=DIAXOM,SN=DTB3006,MR=1,PW=******.
23.36.30 00000.247 JOB,        PF254 = CYCLE    1 ATTACHED FROM SN=EMUS06
23.36.30 00000.251 CYJ,      =ATTACH,TAPE18,OM78STDFACTOR,ID=DIAXOM,SN=DTB3006,MR=1,PW=******.
23.36.30 00000.252 JOB,        PF254 = CYCLE    1 ATTACHED FROM SN=EMUS06
23.36.30 00000.256 CYJ,      =ATTACH,TAPE19,OM78STDLILMAC,ID=DIAXOM,SN=DTB3006,MR=1,PW=******.
23.36.30 00000.257 JOB,        PF254 = CYCLE    1 ATTACHED FROM SN=EMUS06
23.36.30 00000.261 CYJ.
```

Figure IV.1: A Subset of the Printout for the Illustrative Simulation

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23,36.30 00000,262 JOB,    -ATTACH,TAPE70,OM78STDLABELS,ID=DIAXOM,SN=DT83006,PW=******,MR=1.
23,36.30 00000,266 CYJ,       PF254 = CYCLE    1 ATTACHED FROM SN=EMUS06
23,36.30 00000,267 JOB,    -ATTACH,TAPE55,OM78STDBITS,ID=DIAXOM,SN=DT83006,MR=1,PW=******.
23,36.30 00000,271 CYJ,       PF254 = CYCLE    1 ATTACHED FROM SN=EMUS06
23,36.30 00000,272 JOB,    -REQUEST,TAPE21,*PF,SN=COMMON.
23,36.31 00000,273 JOB,    -REQUEST,TAPE24,*PF,SN=COMMON.
23,36.31 00000,274 JOB,    -REQUEST,TAPE25,*PF,SN=COMMON.
23,36.31 00000,276 JOB,    -REQUEST,TAPE26,*PF,SN=COMMON.
23,36.31 00000,277 JOB,    -REQUEST,TAPE27,*PF,SN=COMMON.
23,36.31 00000,278 JOB,    -REQUEST,TAPE28,*PF,SN=COMMON.
23,36.31 00000,280 JOB,    -LDSET,LIB=OM78LIB.
23,36.31 00000,280 JOB,    -LIBLOAD,OM78LIB,TABLO.
23,36.31 00000,281 JOB,    -EXECUTE,,,,,,,,,,,,,,,,TAPE55.
23,36.31 00000,283 CYJ,       RP727 = VSN ADUN06 OF SET EMUS06  MOUNTED
23,36.32 00000,664 CYJ,       LD610 = FLS REQUIRED TO LOAD - 0016250 OU.COG
23,36.32 00000,665 CYJ,       LD603 = EXECUTION INITIATED OS.EXP
23,36.32 00000,666 USR,     FORTRAN LIBRARY 528          07/04/81
23,36.32 00000,671 CYJ,       RP727 = VSN ADUN06 OF SET EMUS06  MOUNTED
23,36.32 00000,680 CYJ,       RP727 = VSN ADUN06 OF SET EMUS06  MOUNTED
23,36.32 00000,686 CYJ,       RP727 = VSN ADUN06 OF SET EMUS06  MOUNTED
23,36.32 00000,693 CYJ,       RP727 = VSN ADUN06 OF SET EMUS06  MOUNTED
23,36.33 00000,700 CYJ,       RP1034= VSN ADUN21 OF SET COMMON  MOUNTED
23,36.33 00000,702 CYJ,       RP1034= VSN ADUN21 OF SET COMMON  MOUNTED
23,36.33 00000,704 CYJ,       RP1034= VSN ADUN21 OF SET COMMON  MOUNTED
23,36.33 00000,706 CYJ,       RP1034= VSN ADUN21 OF SET COMMON  MOUNTED
23,36.33 00000,708 CYJ,       RP1034= VSN ADUN21 OF SET COMMON  MOUNTED
23,36.33 00000,710 CYJ,       RP1034= VSN ADUN21 OF SET COMMON  MOUNTED
23,36.33 00000,713 CYJ,       RP727 = VSN ADUN06 OF SET EMUS06  MOUNTED
23,37.27 00031,190 USR,          END  TABLO
23,37.27 00031,190 USR,        131343  FINAL EXECUTION FL.
23,37.27 00031,190 USR,        30.523 CP SECONDS EXECUTION TIME.
23,37.27 00031,192 JOB,    -CATALOG,TAPE21,PHWRPB      ,ID=DIAXPH,TK=******,XR=******,PW=******,*****,RP=10.
23,37.27 00031,193 CYJ,     FILE SIZE=     334217 WORDS.
23,37.27 00031,196 CYJ,       PF060 = CYCLE    5 CATALOGED ON SN=COMMON
23,37.27 00031,198 JOB,    -CATALOG,TAPE24,PHWRPSBACK ,ID=DIAXPH,TK=******,XR=******,PW=******,*****,RP=10.
23,37.27 00031,199 CYJ,     FILE SIZE=     123149 WORDS.
23,37.27 00031,202 CYJ,       PF060 = CYCLE    5 CATALOGED ON SN=COMMON
23,37.27 00031,204 JOB,    -CATALOG,TAPE25,PHWRPX4BACK,ID=DIAXPH,TK=******,XR=******,PW=******,*****,RP=10.
23,37.27 00031,205 CYJ,     FILE SIZE=      16051 WORDS.
23,37.27 00031,208 CYJ,       PF060 = CYCLE    5 CATALOGED ON SN=COMMON
23,37.27 00031,210 JOB,    -CATALOG,TAPE26,PHWRPX2BACK,ID=DIAXPH,TK=******,XR=******,PW=******,*****,RP=10.
23,37.27 00031,211 CYJ,     FILE SIZE=     138792 WORDS.
23,37.27 00031,214 CYJ,       PF060 = CYCLE    5 CATALOGED ON SN=COMMON
23,37.27 00031,216 JOB,    -CATALOG,TAPE27,PHWRPPNBACK,ID=DIAXPH,TK=******,XR=******,PW=******,*****,RP=10.
23,37.27 00031,217 CYJ,     FILE SIZE=     127961 WORDS.
23,37.28 00031,220 CYJ,       PF060 = CYCLE    5 CATALOGED ON SN=COMMON
23,37.28 00031,221 LOD,    -RETURN,TAPE16,TAPE17,TAPE18,TAPE19,TAPE55.
23,37.28 00031,231 LOD,    -RETURN,OM78LIB.
23,37.28 00031,236 LOD,    -RETURN,TAPE21,TAPE24,TAPE25,TAPE26,TAPE27,TAPE70.
23,37.28 00031,248 LOD,    -REVERT.
23,37.28 00031,259 LOD,    -INVRUN,PHWRP,DIAXPH,COMMON,LABTK,LABXR,10,DIAXOM,DT83006.
23,37.28 00031,294 JOB,    -COMMENT.
23,37.28 00031,294 JOB,    -COMMENT. ***  B E G I N  I N V E R T  ***
23,37.28 00031,295 JOB,    -COMMENT.
23,37.28 00031,296 LOD,    -GETSET,DT82344.
23,37.28 00031,300 CYJ,       RP223 = MNTMACRO-  MOUNT  - SN=DT82344          VSN=
23,37.28 00031,302 CYJ,       SET PARAMETERS SUBSTITUTED
23,37.28 00031,302 CYJ,       RP1034= VSN ADUN05 OF SET EMUS05  MOUNTED
23,37.28 00031,303 LOD,    -GETSET,DT83006.
23,37.29 00031,306 CYJ,       RP223 = MNTMACRO-  MOUNT  - SN=DT83006          VSN=
23,37.29 00031,308 CYJ,       SET PARAMETERS SUBSTITUTED
23.37.29 00031.309 CYJ.       RP1034= VSN ADUN06 OF SET EMUS06  MOUNTED
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23.37.29 00031.309 LOD.    -COMMON.
23.37.29 00031.366 LOD.    -GETSET,COMMON.
23.37.29 00031.370 CYJ.       PF223 - MNTMACRO-  MOUNT  - SN=COMMON            VSN=
23.37.29 00031.372 CYJ.       SET PARAMETERS SUBSTITUTED
23.37.29 00031.373 CYJ.       RP1034- VSN ADUN20 OF SET COMMON  MOUNTED
23.37.29 00031.373 LOD.    -REVERT,CCL
23.37.29 00031.385 JOB.    -ATTACH,OM78LIB,OMORANI78LIB,ID=DIAXOM,SN=DTB3006,MR=1.
23.37.29 00031.389 CYJ.       PF254 - CYCLE    2 ATTACHED FROM SN=EMUS06
23.37.29 00031.390 JOB.    -ATTACH,TAPE21,PHWRPB,ID=DIAXPH,SN=COMMON,PW=******,*****,MR=0.
23.37.29 00031.394 CYJ.       PF254 - CYCLE    5 ATTACHED FROM SN=COMMON
23.37.29 00031.395 JOB.    -LDSET,LIB=OM78LIB.
23.37.29 00031.396 JOB.    -LIBLOAD,OM78LIB,INVERT.
23.37.29 00031.396 JOB.    -EXECUTE.
23.37.29 00031.398 CYJ.       RP727 - VSN ADUN06 OF SET EMUS06  MOUNTED
23.37.31 00031.677 CYJ.       LD610 - FLS REQUIRED TO LOAD - 0013646 OU.COG
23.37.31 00031.678 CYJ.       LD603 - EXECUTION INITIATED OS.EXP
23.37.31 00031.678 USR.     FORTRAN LIBRARY 528          07/04/81
23.37.31 00031.680 CYJ.       RP1034- VSN ADUN21 OF SET COMMON  MOUNTED
23.38.14 00066.722 USR.         STOP
23.38.14 00066.722 USR.         137417   FINAL EXECUTION FL.
23.38.14 00066.722 USR.         35.043 CP SECONDS EXECUTION TIME.
23.38.14 00066.723 JOB.    -ALTER,TAPE21.
23.38.14 00066.727 CYJ.       PF257 - FILE EXTENDED
23.38.14 00066.728 LOD.    -RETURN,TAPE21.
23.38.14 00066.733 LOD.    -RETURN,OM78LIB.
23.38.14 00066.739 LOD.    -REVERT.
23.38.14 00066.749 LOD.    -CMTRUN,PHWRP,DIAXPH,COMMON,LABTK,LABXR,10,DIAXOM,DTB3006.
23.38.15 00066.786 JOB.    -COMMENT.
23.38.15 00066.786 JOB.    -COMMENT. ***  B E G I N   C M A T R X  ***
23.38.15 00066.787 JOB.    -COMMENT.
23.38.15 00066.788 LOD.    -GETSET,DTB2344.
23.38.15 00066.791 CYJ.       RP223 - MNTMACRO-  MOUNT  - SN=DTB2344            VSN=
23.38.15 00066.793 CYJ.       SET PARAMETERS SUBSTITUTED
23.38.15 00066.794 CYJ.       RP1034- VSN ADUN05 OF SET EMUS05  MOUNTED
23.38.15 00066.795 LOD.    -GETSET,DTB3006.
23.38.15 00066.798 CYJ.       RP223 - MNTMACRO-  MOUNT  - SN=DTB3006            VSN=
23.38.15 00066.800 CYJ.       SET PARAMETERS SUBSTITUTED
23.38.15 00066.801 CYJ.       RP1034- VSN ADUN06 OF SET EMUS06  MOUNTED
23.38.15 00066.801 LOD.    -COMMON.
23.38.15 00066.858 LOD.    -GETSET,COMMON.
23.38.15 00066.862 CYJ.       RP223 - MNTMACRO-  MOUNT  - SN=COMMON            VSN=
23.38.15 00066.864 CYJ.       SET PARAMETERS SUBSTITUTED
23.38.15 00066.864 CYJ.       RP1034- VSN ADUN20 OF SET COMMON  MOUNTED
23.38.15 00066.865 LOD.    -REVERT,CCL
23.38.16 00066.877 JOB.    -ATTACH,OM78LIB,OMORANI78LIB,ID=DIAXOM,SN=DTB3006,MR=1.
23.38.16 00066.881 CYJ.       PF254 - CYCLE    2 ATTACHED FROM SN=EMUS06
23.38.16 00066.882 JOB.    -ATTACH,TAPE21,PHWRPB,ID=DIAXPH,SN=COMMON,PW=******.
23.38.16 00066.886 CYJ.       PF254 - CYCLE    5 ATTACHED FROM SN=COMMON
23.38.16 00066.887 JOB.    -REQUEST,TAPE23,*PF,SN=COMMON.
23.38.16 00066.889 JOB.    -LDSET,LIB=OM78LIB.
23.38.16 00066.889 JOB.    -LIBLOAD,OM78LIB,CMATRX.
23.38.16 00066.890 JOB.    -EXECUTE.
23.38.16 00066.892 CYJ.       RP727 - VSN ADUN06 OF SET EMUS06  MOUNTED
23.38.17 00067.154 CYJ.       LD610 - FLS REQUIRED TO LOAD - 0013745 OU.COG
23.38.17 00067.155 CYJ.       LD603 - EXECUTION INITIATED OS.EXP
23.38.17 00067.156 USR.     FORTRAN LIBRARY 528          07/04/81
23.38.17 00067.157 CYJ.       RP1034- VSN ADUN21 OF SET COMMON  MOUNTED
23.38.17 00067.163 CYJ.       RP1034- VSN ADUN21 OF SET COMMON  MOUNTED
23.39.05 00105.137 USR.         STOP
23.39.05 00105.137 USR.         122664   FINAL EXECUTION FL.
23.39.05 00105.137 USR.         37.981 CP SECONDS EXECUTION TIME.
23.39.05 00105.138 JOB.    -CATALOG,TAPE23,PHWRPC,ID=DIAXPH,TK=******,XR=******,PW=******,*****,RP=10
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23.39.05 00105.140 CYJ.       FILE SIZE=    257058 WORDS.
23.39.05 00105.143 CYJ.         PF060 = CYCLE    4 CATALOGED ON SN=COMMON
23.39.05 00105.144 LOD.      =RETURN,TAPE21,TAPE23.
23.39.06 00105.150 LOD.      =RETURN,OM78LIB.
23.39.06 00105.155 LOD.      =REVERT.
23.39.06 00105.166 JOB.      =COMMENT.
23.39.06 00105.166 JOB.      =COMMENT.      *** E N D   S O L U T I O N  ***
23.39.06 00105.167 JOB.      =COMMENT.
23.39.06 00105.167 LOD.      =REVERT.
23.39.06 00105.175 LOD.      =BACKRUN,PHWRP,DIAXPH,COMMON,LABTK,LABXR,ORANTK,ORANTK,ORANTK,ORANTK.
23.39.06 00105.232 JOB.      =COMMENT.
23.39.06 00105.233 JOB.      =COMMENT.  *** B E G I N   B A C K S O L  ***
23.39.06 00105.233 JOB.      =COMMENT.
23.39.06 00105.234 JOB.      =LIMIT,0.
23.39.06 00105.235 LOD.      =GETSET,DTB2344.
23.39.06 00105.239 CYJ.         RP223 = MNTMACRO=  MOUNT  = SN=DTB2344          VSN=
23.39.06 00105.241 CYJ.         SET PARAMETERS SUBSTITUTED
23.39.06 00105.241 CYJ.         RP1034= VSN ADUN05 OF SET EMUS05  MOUNTED
23.39.06 00105.242 LOD.      =GETSET,DTB3006.
23.39.07 00105.245 CYJ.         RP223 = MNTMACRO=  MOUNT  = SN=DTB3006          VSN=
23.39.07 00105.247 CYJ.         SET PARAMETERS SUBSTITUTED
23.39.07 00105.248 CYJ.         RP1034= VSN ADUN06 OF SET EMUS06  MOUNTED
23.39.07 00105.248 LOD.      =COMMON.
23.39.07 00105.303 LOD.      =GETSET,COMMON.
23.39.07 00105.307 CYJ.         RP223 = MNTMACRO=  MOUNT  = SN=COMMON           VSN=
23.39.07 00105.309 CYJ.         SET PARAMETERS SUBSTITUTED
23.39.07 00105.310 CYJ.         RP1034= VSN ADUN20 OF SET COMMON  MOUNTED
23.39.07 00105.310 LOD.      =REVERT.CCL
23.39.07 00105.325 JOB.      =ATTACH,OM78LIB,OMORANI78LIB,ID=DIAXOM,SN=DTB3006,MR=1.
23.39.07 00105.328 CYJ.         PF254 = CYCLE    2 ATTACHED FROM SN=EMUS06
23.39.07 00105.330 JOB.      =ATTACH,TAPE12,OM78STDSPIDER,ID=DIAXOM,SN=DTB3006,PW=******.
23.39.08 00105.333 CYJ.         PF254 = CYCLE    1 ATTACHED FROM SN=EMUS06
23.39.08 00105.334 JOB.      =ATTACH,TAPE18,OM78STDFACTOR,ID=DIAXOM,SN=DTB3006,PW=******.
23.39.08 00105.338 CYJ.         PF254 = CYCLE    1 ATTACHED FROM SN=EMUS06
23.39.08 00105.339 JOB.      =ATTACH,TAPE19,OM78STDLILMAC,ID=DIAXOM,SN=DTB3006,PW=******.
23.39.08 00105.343 CYJ.         PF254 = CYCLE    1 ATTACHED FROM SN=EMUS06
23.39.08 00105.344 JOB.      =ATTACH,TAPE55,OM78STDBITS,ID=DIAXOM,SN=DTB3006,PW=******.
23.39.08 00105.348 CYJ.         PF254 = CYCLE    1 ATTACHED FROM SN=EMUS06
23.39.08 00105.349 JOB.      =ATTACH,TAPE24,PHWRPSBACK,ID=DIAXPH,SN=COMMON,PW=******.
23.39.08 00105.353 CYJ.         PF254 = CYCLE    5 ATTACHED FROM SN=COMMON
23.39.08 00105.354 JOB.      =ATTACH,TAPE25,PHWRPX4BACK,ID=DIAXPH,SN=COMMON,PW=******.
23.39.08 00105.358 CYJ.         PF254 = CYCLE    5 ATTACHED FROM SN=COMMON
23.39.08 00105.359 JOB.      =ATTACH,TAPE26,PHWRPX2BACK,ID=DIAXPH,SN=COMMON,PW=******.
23.39.08 00105.363 CYJ.         PF254 = CYCLE    5 ATTACHED FROM SN=COMMON
23.39.08 00105.364 JOB.      =ATTACH,TAPE27,PHWRPPNBACK,ID=DIAXPH,SN=COMMON,PW=******.
23.39.08 00105.368 CYJ.         PF254 = CYCLE    5 ATTACHED FROM SN=COMMON
23.39.08 00105.369 JOB.      =ATTACH,TAPE21,PHWRPB,ID=DIAXPH,SN=COMMON,PW=******.
23.39.08 00105.373 CYJ.         PF254 = CYCLE    5 ATTACHED FROM SN=COMMON
23.39.08 00105.374 JOB.      =REQUEST,TAPE51,*PF,SN=COMMON.
23.39.08 00105.376 JOB.      =LDSET,LIB=OM78LIB.
23.39.08 00105.376 JOB.      =LIBLOAD,OM78LIB,BCKBITS.
23.39.08 00105.377 JOB.      =EXECUTE.
23.39.08 00105.379 CYJ.         RP727 = VSN ADUN06 OF SET EMUS06  MOUNTED
23.39.09 00105.678 CYJ.         LD610 = FLS REQUIRED TO LOAD = 0014375 OU.COG
23.39.09 00105.682 CYJ.         LD603 = EXECUTION INITIATED OS.EXP
23.39.09 00105.683 USR.        FORTRAN LIBRARY 528          07/04/81
23.39.09 00105.685 CYJ.         RP1034= VSN ADUN21 OF SET COMMON  MOUNTED
23.39.09 00105.692 CYJ.         RP727 = VSN ADUN06 OF SET EMUS06  MOUNTED
23.39.09 00105.698 CYJ.         RP1034= VSN ADUN21 OF SET COMMON  MOUNTED
23.39.09 00105.705 CYJ.         RP1034= VSN ADUN21 OF SET COMMON  MOUNTED
23.39.10 00105.712 CYJ.         RP1034= VSN ADUN21 OF SET COMMON  MOUNTED
23.39.10 00105.720 CYJ.         RP1034= VSN ADUN21 OF SET COMMON  MOUNTED
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23,39,10 00105,728 CYJ,        RP727 - VSN ADUN06 OF SET EMUS06  MOUNTED
23,39,10 00105,734 CYJ,        RP727 - VSN ADUN06 OF SET EMUS06  MOUNTED
23,39,10 00105,741 CYJ,        RP727 - VSN ADUN06 OF SET EMUS06  MOUNTED
23,39,20 00108,008 CYJ,        RP1034- VSN ADUN21 OF SET COMMON  MOUNTED
23,39,31 00110,536 USR,          STOP
23,39,31 00110,536 USR,          064700   FINAL EXECUTION FL.
23,39,31 00110,537 USR,           4.852 CP SECONDS EXECUTION TIME.
23,39,31 00110,537 LOD,      -RETURN,TAPE12 TAPE18,TAPE19,TAPE55,TAPE24,TAPE25,TAPE26,TAPE27.
23,39,31 00110,550 LOD,      -REWIND,TAPE51.
23,39,32 00110,555 JOB,      -ATTACH,TAPE23,PHWRPC,ID=DIAXPH,SN=COMMON,PW=******.
23,39,32 00110,558 CYJ,        PF254 - CYCLE     4 ATTACHED FROM SN=COMMON
23,39,32 00110,560 JOB,      -ATTACH,TAPE70,OM78STDLABELS,ID=DIAXOM,SN=DTB3006,PW=******.
23,39,32 00110,563 CYJ,        PF254 - CYCLE     1 ATTACHED FROM SN=EMUS06
23,39,32 00110,564 JOB,      -REQUEST,TAPE52,*PF,SN=COMMON.
23,39,32 00110,566 JOB,      -LDSET,LIB=OM78LIB.
23,39,32 00110,566 JOB,      -LIBLOAD,OM78LIB,BCKSOL.
23,39,32 00110,567 JOB,      -EXECUTE.
23,39,33 00110,930 CYJ,        LD610 - FLS REQUIRED TO LOAD - 0015425 OU.COG
23,39,33 00110,939 CYJ,        LD603 - EXECUTION INITIATED OS,EXP
23,39,33 00110,939 USR,       FORTRAN LIBRARY 528           07/04/81
23,39,33 00110,943 CYJ,        RP1034- VSN ADUN21 OF SET COMMON  MOUNTED
23,39,33 00110,947 CYJ,        RP727 - VSN ADUN06 OF SET EMUS06  MOUNTED
23,39,33 00110,996 CYJ,        RP727 - VSN ADUN20 OF SET COMMON  MOUNTED
23,48,33 00376,852 USR,          STOP
23,48,33 00376,852 USR,          137200   FINAL EXECUTION FL.
23,48,33 00376,852 USR,          265.910 CP SECONDS EXECUTION TIME.
23,48,33 00376,854 JOB,      -CATALOG,TAPE52,PHWRPBACKSOL,ID=DIAXPH,TK=******,XR=******,PW=******,*****,RP=10.
23,48,33 00376,855 CYJ,       FILE SIZE=   1268730 WORDS.
23,48,33 00376,860 CYJ,        PF060 - CYCLE     3 CATALOGED ON SN=COMMON
23,48,33 00376,860 LOD,      -RETURN,TAPE51,TAPE23,TAPE52,TAPE70.
23,48,33 00376,870 LOD,      -RETURN,OM78LIB.
23,48,33 00376,875 LOD,      -REVERT.
23,48,33 00376,883 LOD,      -PIERUN,PHWRP,DIAXPH,COMMON,LABTK,LABXR,ORANTK.
23,48,33 00376,926 JOB,      -COMMENT.
23,48,33 00376,926 JOB,      -COMMENT. *** B E G I N  P I E ***
23,48,33 00376,927 JOB,      -COMMENT.
23,48,33 00376,928 LOD,      -GETSET,DTB2344.
23,48,33 00376,931 CYJ,        RP223 - MNTMACRO-  MOUNT  - SN=DTB2344          VSN=
23,48,34 00376,934 CYJ,        SET PARAMETERS SUBSTITUTED
23,48,34 00376,934 CYJ,        RP1034- VSN ADUN05 OF SET EMUS05  MOUNTED
23,48,34 00376,935 LOD,      -GETSET,DTB3006.
23,48,34 00376,938 CYJ,        RP223 - MNTMACRO-  MOUNT  - SN=DTB3006          VSN=
23,48,34 00376,941 CYJ,        SET PARAMETERS SUBSTITUTED
23,48,34 00376,941 CYJ,        RP1034- VSN ADUN06 OF SET EMUS06  MOUNTED
23,48,34 00376,942 LOD,      -COMMON.
23,48,34 00376,995 LOD,      -GETSET,COMMON.
23,48,34 00376,999 CYJ,        RP223 - MNTMACRO-  MOUNT  - SN=COMMON           VSN=
23,48,34 00377,001 CYJ,        SET PARAMETERS SUBSTITUTED
23,48,34 00377,001 CYJ,        RP1034- VSN ADUN20 OF SET COMMON  MOUNTED
23,48,34 00377,002 LOD,      -REVERT,CCL
23,48,34 00377,015 JOB,      -ATTACH,OM78LIB,OMORANT78LIB,ID=DIAXOM,SN=DTB3006,MR=1.
23,48,34 00377,019 CYJ,        PF254 - CYCLE     2 ATTACHED FROM SN=EMUS06
23,48,34 00377,019 LOD,      -DCR.
23,48,35 00377,045 LOD,      -IFE,.NOT.FILE(DCRLIB,AS),0.
23,48,35 00377,052 JOB,      -ATTACH,DCRLIB,DCR,ID=PUBLIC,SN=SYSTEM.  LIBRARY OF CCL PROCEDURES
23,48,35 00377,056 CYJ,        PF254 - CYCLE    27 ATTACHED FROM SN=SYSTEM
23,48,35 00377,056 JOB,      -LIBRARY,*,DCRLIB.
23,48,35 00377,062 LOD,      -ENDIF,0.
23,48,35 00377,070 LOD,      -REVERT,CCL
23,48,36 00377,084 LOD,      -NAGS.
23,48,36 00377,116 LOD,      -PKGUZE,NAGS.
23,48,38 00377,206 JOB,      -ATTACH,NAGS,NAG7SCM.
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23.48.38 00377.210 CYJ.       PF254 - CYCLE     2 ATTACHED FROM SN=SYSTEM
23.48.38 00377.211 JOB.    =LIBRARY,*,NAGS.
23.48.38 00377.238 LOD.    =REVERT.
23.48.38 00377.262 JOB.    =ATTACH,TAPE70,DM78STDLABELS,ID=DIAXDM,SN=DT83006,PW=******.
23.48.38 00377.266 CYJ.       PF254 - CYCLE     1 ATTACHED FROM SN=EMUS06
23.48.38 00377.267 JOB.    =EXIT(C)
23.48.38 00377.268 JOB.    =ATTACH,TAPE52,PHWRPBACKSOL,ID=DIAXPH,SN=COMMON,PW=******.
23.48.38 00377.273 CYJ.       PF254 - CYCLE     3 ATTACHED FROM SN=COMMON
23.48.38 00377.273 JOB.    =EXIT,U.
23.48.38 00377.275 JOB.    =ATTACH,TAPE23,PHWRPC,ID=DIAXPH,SN=COMMON,PW=******.
23.48.38 00377.279 CYJ.       PF254 - CYCLE     4 ATTACHED FROM SN=COMMON
23.48.38 00377.279 JOB.    =REQUEST,TAPE30,*PF,SN=COMMON.
23.48.38 00377.281 JOB.    =LDSET(LIB=DM78LIB/NAGS)
23.48.39 00377.282 JOB.    =LIBLOAD,DM78LIB,PJE.
23.48.39 00377.282 JOB.    =EXECUTE,,PL=10000.
23.48.39 00377.284 CYJ.       RP727 - VSN ADUN06 OF SET EMUS06  MOUNTED
23.48.41 00377.776 CYJ.       LO610 - FLS REQUIRED TO LOAD - 0016155 OU.COG
23.48.41 00377.777 CYJ.       LO603 - EXECUTION INITIATED OS.EXP
23.48.41 00377.778 USR.      FORTRAN LIBRARY 528           07/04/81
23.48.41 00377.780 CYJ.       RP1034- VSN ADUN21 OF SET COMMON  MOUNTED
23.48.41 00377.792 CYJ.       RP727 - VSN ADUN06 OF SET EMUS06  MOUNTED
23.48.41 00378.100 CYJ.       RP727 - VSN ADUN20 OF SET COMMON  MOUNTED
23.48.45 00379.308 USR.         STOP
23.48.45 00379.308 USR.         137777   FINAL EXECUTION FL.
23.48.45 00379.308 USR.         1.529 CP SECONDS EXECUTION TIME.
23.48.45 00379.309 LOD.    =RETURN,DM78LIB.
23.48.46 00379.326 JOB.    =EXIT(C)
23.48.46 00379.327 JOB.    =CATALOG,TAPE30,PHWRPPIEOUT,ID=DIAXPH,SN=COMMON,TK=******,XR=******,PW=******,*****.
23.48.46 00379.328 JOB.    =IRP=10.
23.48.46 00379.328 CYJ.       PF030 - CATALOG ATTEMPT ON NULL,INPUT, OR OUTPUT FILE
23.48.46 00379.328 CYJ.       SC031 - JOB ABORTED
23.48.46 00379.330 JOB.    =EXIT(U)
23.48.46 00379.330 LOD.    =REVERT.
23.48.46 00379.360 CYJ.       PDIAXPH              5.120  KCHAR
23.48.46 00379.361 CYJ.       DFILEPH             30.270  KCHAR
23.48.46 00379.361 CYJ.       OUTPUT             429.080  KCHAR
23.48.46 00379.361 CYJ.       SC050 - 001676 SC/LC SWAPS
23.48.46 00379.361 CYJ.
23.48.46 00379.362 CYJ.       USR-TIME           340.061  SEC
23.48.46 00379.362 CYJ.       CPU-TIME           379.363  SEC          15.174  $
23.48.46 00379.362 CYJ.       SCM.TIME           182.003  MCSEC        14.560  $
23.48.46 00379.363 CYJ.       LCM.TIME           150.706  MCSEC         6.028  $
23.48.46 00379.363 CYJ.       FILE-IO            287.200  MCHAR         4.595  $
23.48.46 00379.363 CYJ.       CENT-IO              0.465  MCHAR         0.007  $
23.48.46 00379.363 CYJ.       RATE                 4.000  CENTS/UNIT
23.48.46 00379.364 CYJ.       SUBTOTAL         1 009.099  RU           40.364  $
23.48.46 00379.364 CYJ.       FLAGFALL                                 17.250  $
23.48.46 00379.364 CYJ.       PRIORITY             2000  B
23.48.46 00379.365 CYJ.       CHARGE                                   57.61   $
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PROGRAM WILL BE ENTERED AT TABLO (7064) SCM LENGTH 34024 LCM LENGTH 10

BLOCK	ADDRESS	LENGTH	FILE	DATE	PROCESSOR	VER LEVEL	HARDWARE	COMMENTS
/ICOM1/	110	6372	UL=OM78LIB					
TABLO	6502	756	UL=OM78LIB	10/12/80	FTN	4.7 470	IL	PROGRAM OPT=2 TRACE
BOSS	7060	1212	UL=OM78LIB	10/12/80	FTN	4.7 470	IL	SUBROUTINEOPT=2 TRACE
VBLE	10672	1047	UL=OM78LIB	10/12/80	FTN	4.7 470	IL	SUBROUTINEOPT=2 TRACE
PARAM	11741	1161	UL=OM78LIB	10/12/80	FTN	4.7 470	IL	SUBROUTINEOPT=2 TRACE
PREP	13122	1401	UL=OM78LIB	10/12/80	FTN	4.7 470	IL	SUBROUTINEOPT=2 TRACE
AB	14563	2356	UL=OM78LIB	10/12/80	FTN	4.7 470	IL	SUBROUTINEOPT=2 TRACE
INVEST	17141	144	UL=OM78LIB	10/12/80	FTN	4.7 470	IL	SUBROUTINEOPT=2 TRACE
XX2	17305	201	UL=OM78LIB	10/12/80	FTN	4.7 470	IL	SUBROUTINEOPT=2 TRACE
SEP	17506	71	UL=OM78LIB	10/12/80	FTN	4.7 470	IL	SUBROUTINEOPT=2 TRACE
SHADED	17577	71	UL=OM78LIB	10/12/80	FTN	4.7 470	IL	SUBROUTINEOPT=2 TRACE
SPLIT	17670	704	UL=OM78LIB	10/12/80	FTN	4.7 470	IL	SUBROUTINEOPT=2 TRACE
WRTRAS	20574	307	UL=OM78LIB	10/12/80	FTN	4.7 470	I	SUBROUTINEOPT=2 TRACE
WRTRAL	21103	310	UL=OM78LIB	10/12/80	FTN	4.7 470	IL	SUBROUTINEOPT=2 TRACE
REDRAS	21413	552	UL=OM78LIB	10/12/80	FTN	4.7 470	I	SUBROUTINEOPT=2 TRACE
REDRAL	22165	554	UL=OM78LIB	10/12/80	FTN	4.7 470	IL	SUBROUTINEOPT=2 TRACE
MATFLS	22741	365	UL=OM78LIB	10/12/80	FTN	4.7 470	I	SUBROUTINEOPT=2 TRACE
MATFLL	23326	365	UL=OM78LIB	10/12/80	FTN	4.7 470	IL	SUBROUTINEOPT=2 TRACE
OPENRA	23713	134	UL=OM78LIB	10/12/80	FTN	4.7 470	I	SUBROUTINEOPT=2 TRACE
ENDRA	24047	53	UL=OM78LIB	10/12/80	FTN	4.7 470	I	SUBROUTINEOPT=2 TRACE
/ERROR/	24122	1	UL=OM78LIB					
ERROR	24123	67	UL=OM78LIB	10/12/80	FTN	4.7 470	I	SUBROUTINEOPT=2 TRACE
SYSAID=	24212	1	SL=ZZZZZFL	07/04/81	COMPASS	3.6 528		LINK BETWEEN SYS=AID AND INITIALIZATION CODE.
/STP.END/	24213	1	SL=ZZZZZFL					
/FCL.C./	24214	30	SL=ZZZZZFL					
/IO.IO./	24244	160	SL=ZZZZZFL					
Q2NTRY=	24424	4	SL=ZZZZZFL	07/04/81	COMPASS	3.6 528		FCL INITIALIZATION ROUTINE.
BACKSP=	24430	67	SL=ZZZZZFL	07/04/81	COMPASS	3.6 528		BACKSPACE LOGICAL RECORD.
COMIO=	24517	10	SL=ZZZZZFL	07/04/81	COMPASS	3.6 528		COMMON CODED I/O ROUTINES AND CONSTANTS.
/IO.BUF./	24527	227	SL=ZZZZZFL					
DISPLA	24756	170	SL=ZZZZZFL	07/04/81	COMPASS	3.6 528		ISSUE MESSAGE AND VALUE TO DAYFILE.
ENDFIL=	25146	46	SL=ZZZZZFL	07/04/81	COMPASS	3.6 528		WRITE END OF LOGICAL FILE MARK.
EOF	25214	20	SL=ZZZZZFL	07/04/81	COMPASS	3.6 528		TEST FOR END OF FILE STATUS.
FFCMSK=	25234	41	SL=ZZZZZFL	07/04/81	COMPASS	3.6 528		INITIALIZE CONSTANTS.
FFIRST=	25275	3	SL=ZZZZZFL	07/04/81	COMPASS	3.6 528		CONVERTED DATA STORAGE
FLTIN=	25300	156	SL=ZZZZZFL	07/04/81	COMPASS	3.6 528		COMMON FLOATING INPUT CONVERTER.
FLTOUT=	25456	315	SL=ZZZZZFL	07/04/81	COMPASS	3.6 528		COMMON FLOATING OUTPUT CODE
FMTAP=	25773	377	SL=ZZZZZFL	07/04/81	COMPASS	3.6 528		CRACK APLIST AND FORMAT FOR KODER/KRAKER.
FORSYS=	26372	351	SL=ZZZZZFL	07/04/81	COMPASS	3.6 528		FORTRAN OBJECT LIBRARY UTILITIES.
FORUTL=	26743	25	SL=ZZZZZFL	07/04/81	COMPASS	3.6 528		FCL MISC. UTILITIES.
GETFIT=	26770	66	SL=ZZZZZFL	07/04/81	COMPASS	3.6 528		LOCATE A FIT GIVEN A FILE DESCRIPTOR
GOTOER=	27056	14	SL=ZZZZZFL	07/04/81	COMPASS	3.6 528		COMPUTED GO TO ERROR PROCESSOR.
INCOM=	27072	144	SL=ZZZZZFL	07/04/81	COMPASS	3.6 528		COMMON INPUT FORMATTING CODE
INPB=	27236	442	SL=ZZZZZFL	07/04/81	COMPASS	3.6 528		BINARY READ FORTRAN RECORD.
INPC=	27700	175	SL=ZZZZZFL	07/04/81	COMPASS	3.6 528		FORMATTED READ FORTRAN RECORD.
KODER=	30075	476	SL=ZZZZZFL	07/04/81	COMPASS	3.6 528		OUTPUT FORMAT INTERPRETER.
KRAKER=	30573	454	SL=ZZZZZFL	07/04/81	COMPASS	3.6 528		PROCESS FORMATTED FORTRAN INPUT.
OUTB=	31247	223	SL=ZZZZZFL	07/04/81	COMPASS	3.6 528		BINARY WRITE@@@@@@AN@@@@@@D,@@@@@@@.
OUTCOM=	31472	204	SL=ZZZZZFL	07/04/81	COMPASS	3.6 528		COMMON OUTPUT CODE
OUTC=	31676	161	SL=ZZZZZFL	07/04/81	COMPASS	3.6 528		FORMATTED WRITE FORTRAN RECORD.
REWIND=	32057	54	SL=ZZZZZFL	07/04/81	COMPASS	3.6 528		POSITION FILE AT BEGINNING-OF-INFORMATION.
SPA=	32133	12	SL=ZZZZZFL	07/04/81	COMPASS	3.6 528		SPA= = SUBSTITUTE PARAMETER ADDRESSES.

WAGE RELATIVITY EXPERIMENT

EXOGENOUS VARIABLES

VARIABLE	COMPONENT	CHANGE
FO SHIFT TERM FOR OCCUPATION WAGE RATES	1 PROFESSIONAL W.C.	-5.30000
FO SHIFT TERM FOR OCCUPATION WAGE RATES	2 SKILLED W.C.	-7.74000
FO SHIFT TERM FOR OCCUPATION WAGE RATES	3 SEMI AND UNSKILLED W.C.	2.69000
FO SHIFT TERM FOR OCCUPATION WAGE RATES	4 SKILLED B.C. METAL & ELEC	-.26000
FO SHIFT TERM FOR OCCUPATION WAGE RATES	5 SKILLED B.C. BUILDING	-1.73000
FO SHIFT TERM FOR OCCUPATION WAGE RATES	6 SKILLED B.C. OTHER	-8.68000
FO SHIFT TERM FOR OCCUPATION WAGE RATES	7 SEMI AND UNSKILLED B.C.	5.89000
FO SHIFT TERM FOR OCCUPATION WAGE RATES	8 RURAL WORKERS	1.62000

SIZE 273 BY 8

ROW / COLUMN		FD 1	FD 2	FD 3	FD 4	FD 5	FD 6	FD 7	FD 8	ROW TOTALS
INDUSTRY OUTPUTS										
Z 1	PASTORAL ZONE	.1713	.9098	-.4171	.0140	.0169	.2050	-.8405	-.3024	-.2430
Z 2	WHEAT/SHEEP ZONE	.1697	.8968	-.4186	.0143	.0173	.1844	-.8588	-.2973	-.2922
Z 3	HIGH RAINFALL ZONE	.3339	1.7604	-.8097	.0273	.0325	.4300	-1.6638	-.5276	-.4170
Z 4	NORTHERN BEEF	.2517	1.3386	-.6216	.0212	.0257	.3888	-1.3034	-.4025	-.3017
Z 5	MILK CATTLE	.1102	.5912	-.2744	.0091	.0108	.1990	-.5720	-.1814	-.1074
Z 6	OTHER FARMING EXPORT	.3806	1.9410	-.8568	.0323	.0362	.2943	-1.9729	-.3741	-.5193
Z 7	OTHER FARMING IMPORT COMP	.0889	.5080	-.2386	.0076	.0088	.1164	-.5483	-.1727	-.2220
Z 8	POULTRY	.0906	.4852	-.2243	.0075	.0088	.1617	-.4662	-.1413	-.0780
Z 9	SERVICES TO AGRICULTURE	.2264	1.1905	-.5444	.0189	.0222	.2525	-1.1556	-.3401	-.3296
Z 10	FORESTRY	.2680	1.3232	-.5669	.0251	.0395	.1901	-1.6417	-.1259	-.4886
Z 11	FISHING	.6206	3.0313	-1.3837	.0476	.0596	.4724	-2.7122	-.8064	-.6708
Z 12	IRON	.0990	.3919	-.1711	.0099	.0074	.0550	-.4730	-.0131	-.0940
Z 13	OTHER METALLIC MINERALS	.6455	2.6174	-1.0852	.0529	.0528	.3538	-3.1905	-.0853	-.6386
Z 14	COAL	.9664	4.9466	-2.1829	.1172	.1080	.6973	-6.7176	-.1756	-2.2406
Z 15	CRUDE OIL	.0892	.4578	-.2091	.0095	.0103	.0798	-.5407	-.0657	-.1688
Z 16	NON-METALLIC MINERALS N.E	.1065	.5184	-.2056	.0105	.0170	.0742	-.7346	-.0190	-.2326
Z 17	SERVICES TO MINING	.0746	.3405	-.1460	.0075	.0072	.0471	-.4378	-.0119	-.1187
Z 18	MEAT PRODUCTS	.2897	1.5436	-.7115	.0238	.0282	.5053	-1.4768	-.4435	-.2412
Z 19	MILK PRODUCTS	.0099	.0543	-.0252	.0008	.0009	.0039	-.0647	-.0211	-.0411
Z 20	FRUIT & VEG PRODUCTS	.0033	.0620	-.0393	.0015	.0006	.0021	-.1714	-.0245	-.1617
Z 21	MARGE, OILS & FATS	.1493	.7473	-.3300	.0127	.0132	.1077	-.8131	-.0596	-.1725
Z 22	FLOUR & CEREAL PRODS	.0570	.2994	-.1366	.0047	.0054	.0827	-.3195	-.0531	-.0599
Z 23	BREAD, CAKES	.0048	.0508	-.0328	.0005	.0004	.1014	-.0781	-.0030	.0439
Z 24	CONFECTIONERY	.0385	.2721	-.1373	.0038	.0039	.0370	-.4754	-.0156	-.2729
Z 25	FOOD PRODUCTS N.E.C.	.8244	4.1333	-1.8100	.0695	.0781	.6084	-4.1537	-.7006	-.9506
Z 26	SOFT DRINKS, CORDIALS	-.0062	.0559	-.0287	.0005	-.0002	-.0041	-.1440	-.0038	-.1307
Z 27	BEER & MALT	.0002	.1274	-.0225	.0003	.0003	.0449	-.2281	-.0086	-.0861
Z 28	ALCOHOLIC DRINKS N.E.C.	.0735	.5203	-.2267	.0062	.0088	.0794	-.6436	-.0889	-.2710
Z 29	TOBACCO	.0216	.1330	-.0796	.0013	.0013	.0358	-.1822	-.0243	-.0932
Z 30	PREPARED FIBRES	.4136	2.2825	-1.0100	.0345	.0407	.5565	-2.4847	-.4137	-.5805
Z 31	MAN-MADE FIBRES, YARN	.4124	2.3469	-.9986	.0359	.0408	.7696	-2.8312	-.0827	-.3067
Z 32	COTTON, SILK, FLAX	.3647	2.0624	-.9007	.0303	.0352	1.0087	-2.5394	-.0910	-.0298
Z 33	WOOL & WORSTED YARNS	.0668	.4506	-.2023	.0058	.0076	.2567	-.6338	-.0222	-.0711
Z 34	TEXTILE FINISHING	.0656	.4593	-.1921	.0058	.0202	.1556	-.6367	-.0165	-.1389
Z 35	TEXTILE FLOOR COVERS	.0995	.7070	-.3352	.0106	.0125	.5765	-1.1191	-.0338	-.0819
Z 36	TEXTILE PRODUCTS N.E.C.	.2434	1.4142	-.6063	.0203	.0266	.2962	-1.7184	-.0706	-.3946
Z 37	KNITTING MILLS	.0511	.3671	-.1643	.0042	.0052	.2538	-.4978	-.0124	.0067
Z 38	CLOTHING	.0550	.3995	-.1741	.0043	.0049	.2069	-.5924	-.0136	-.1094
Z 39	FOOTWEAR	.1916	1.1670	-.5181	.0152	.0187	.2037	-1.8576	-.0351	-.8146
Z 40	SAWMILL PRODUCTS	.1700	.9497	-.3941	.0146	.0390	.1310	-1.2108	-.0846	-.3851
Z 41	PLYWOOD, VENEERS	.1141	.6855	-.2883	.0100	.0746	.0852	-.9012	-.0416	-.2617
Z 42	JOINERY & WOOD PRODS	.0447	.3000	-.1275	.0036	.0431	.0290	-.3054	-.0165	-.0290
Z 43	FURNITURE, MATTRESSES	-.0769	-.1462	.1014	-.0045	.0908	-.0306	-.1020	.0114	-.1566
Z 44	PULP, PAPER	.2689	1.3514	-.5955	.0237	.0275	.2526	-1.5396	-.0877	-.2988
Z 45	FIBREBOARD	.1259	.6973	-.3109	.0123	.0139	.1290	-.7859	-.0818	-.2002
Z 46	PAPER PRODUCTS N.E.C.	.0964	.5733	-.2554	.0086	.0095	.1145	-.7328	-.0469	-.2328
Z 47	NEWSPAPERS & BOOKS	.1367	.9113	-.3782	.0104	.0114	.2502	-.7018	-.0377	.2024

WAGE RELATIVITY EXPERIMENT

SIZE 273 BY 8

ROW / COLUMN	FD 1	FD 2	FD 3	FD 4	FD 5	FD 6	FD 7	FD 8	ROW TOTALS
Z 48 COMMERCIAL PRINTING	.1076	.6027	-.2689	.0092	.0104	.1886	-.6337	-.0404	-.0245
Z 49 CHEMICAL FERTILISERS	.2386	1.2187	-.5575	.0196	.0231	.2570	-1.1883	-.3147	-.3035
Z 50 INDUSTRIAL CHEMICALS	.4308	1.9172	-.7995	.0322	.0347	.2743	-1.8888	-.0752	-.0742
Z 51 PAINTS, VARNISHES	.0990	.5286	-.2251	.0129	.0170	.0790	-.5769	-.0272	-.0926
Z 52 PHARMACEUTICALS	.2828	1.2451	-.5427	.0122	.0137	.1624	-.9161	-.0756	.1818
Z 53 SOAP & DETERGENTS	.0801	.4407	-.2103	.0038	.0044	.0668	-.4758	-.0168	-.1070
Z 54 COSMETICS, TOILETRY	.0604	.4405	-.2474	.0029	.0033	.0529	-.5099	-.0157	-.2130
Z 55 CHEMICAL PRODS N.E.C.	.2793	1.4349	-.6018	.0253	.0295	.1939	-1.4966	-.0529	-.1884
Z 56 OIL & COAL PRODUCTS	.0892	.4578	-.2091	.0095	.0103	.0798	-.5407	-.0657	-.1688
Z 57 GLASS	.1652	.9185	-.3992	.0166	.0235	.1309	-1.1303	-.0369	-.3117
Z 58 CLAY PRODUCTS	.1083	.5514	-.2317	.0114	.0149	.0759	-.7415	-.0175	-.2288
Z 59 CEMENT	.0747	.2870	-.1096	.0067	.0134	.0438	-.4815	-.0083	-.1738
Z 60 READY-MIXED CONCRETE	-.0086	-.0874	.0513	-.0011	.0073	-.0058	-.0431	.0047	-.0827
Z 61 CONCRETE PRODUCTS	.0126	.0193	.0025	.0014	.0086	.0082	-.1668	.0008	-.1135
Z 62 NON-METAL MIN PRODS	.0826	.4282	-.1756	.0079	.0264	.0603	-.5505	-.0127	-.1335
Z 63 BASIC IRON & STEEL	.7107	3.4458	-1.4970	.0872	.0778	.4639	-3.8868	-.1061	-.7046
Z 64 OTHER BASIC METALS	.7232	3.3236	-1.4153	.0712	.0653	.4531	-3.5330	-.0998	-.4117
Z 65 STRUCTURAL METAL	.0382	.2293	-.1101	.0083	.0119	.0234	-.3056	-.0228	-.1274
Z 66 SHEET METAL PRODS	-.0444	-.1769	.1349	-.0017	-.0008	-.0243	.0585	-.0391	-.0938
Z 67 METAL PRODUCTS N.E.C.	.1772	1.0421	-.4467	.0304	.0262	.1415	-1.1026	-.0456	-.1775
Z 68 MOTOR VEHICLES, PARTS	.3022	1.6054	-.7160	.0548	.0392	.2406	-1.5750	-.0674	-.1168
Z 69 SHIP & BOAT BUILDING	.2199	1.8561	-.8230	.0442	.0474	.2446	-1.4300	-.2469	-.0877
Z 70 LOCOMOTIVES	.2730	1.4682	-.6622	.0373	.0355	.1873	-1.6956	.0036	-.3528
Z 71 AIRCRAFT BUILDING	.1166	.6961	-.2684	.0278	.0110	.0726	-.5458	-.0220	.0879
Z 72 SCIENTIFIC EQUIPT	.0921	.6401	-.3025	.0130	.0075	.0755	-.5104	-.0338	-.0185
Z 73 ELECTRONIC EQUIPT	.1877	1.0937	-.4426	.0233	.0191	.1151	-1.0536	-.0186	-.0760
Z 74 HOUSEHOLD APPLIANCES	-.0341	-.0481	.0522	.0081	.0031	-.0352	.0818	.0019	-.1339
Z 75 ELECTRICAL MACHINERY	.1719	.9374	-.4073	.0238	.0188	.1236	-.9768	-.0337	-.1423
Z 76 AGRICULTURAL MACH.	.5454	3.0252	-1.4121	.0519	.0680	.6518	-3.0127	-.0946	-.1771
Z 77 CONSTRUCTION EQUIPT	.2254	1.2521	-.5740	.0280	.0051	.1367	-1.2157	-.0427	-.1850
Z 78 OTHER MACHINERY	.1471	.9007	-.3965	.0245	.0047	.1023	-.8421	-.0434	-.1024
Z 79 LEATHER PRODUCTS	.1482	.9767	-.4204	.0122	.0155	.1553	-1.4432	-.0318	-.5876
Z 80 RUBBER PRODUCTS	.1620	.9130	-.4130	.0191	.0188	.1402	-1.1163	-.0495	-.3257
Z 81 PLASTIC PRODUCTS	.1790	1.0088	-.4364	.0162	.0183	.1453	-1.1320	-.0513	-.2520
Z 82 SIGNS, WRITING EQUIPT	.1296	.7973	-.3334	.0127	.0529	.1136	-.7448	-.0461	-.0182
Z 83 OTHER MANUFACTURING	.0898	.6763	-.3062	.0159	.0141	.0831	-.6556	-.0372	-.1200
Z 84 ELECTRICITY	.1185	.5313	-.2114	.0192	.0119	.0687	-.5823	-.0289	-.0730
Z 85 GAS	.0656	.2694	-.1823	.0177	.0063	.0183	-.4231	-.0092	-.2375
Z 86 WATER, SEWERAGE	.0568	.2515	-.0989	.0039	.0052	.0387	-.2802	-.0260	-.0490
Z 87 RESIDENTIAL BUILDING	0.0000*	0.0000*	0.0000*	0.0000*	0.0000*	0.0000*	0.0000*	0.0000*	0.0000*
Z 88 BUILDING N.E.C.	-.0211	-.1650	.0896	-.0026	.0085	-.0147	.0100	.0081	-.0873
Z 89 WHOLESALE TRADE	.0895	.5044	-.2310	.0098	.0097	.0925	-.5414	-.0642	-.1307
Z 90 RETAIL TRADE	-.0304	-.0633	-.0013	-.0016	.0001	.0115	.0519	-.0043	-.0374
Z 91 MOTOR VEHICLE REPAIR	.0037	.2530	-.0615	.0345	.0229	.0140	-.2314	-.0302	.0051
Z 92 OTHER REPAIRS	.0357	.1376	-.1743	.0214	.0057	.0871	-.3319	-.0513	-.0699
Z 93 ROAD TRANSPORT	.1631	.8594	-.3828	.0175	.0188	.1476	-1.0245	-.0911	-.2922
Z 94 RAILWAY TRANSPORT	.2363	1.1860	-.5399	.0261	.0271	.1741	-1.5053	-.1074	-.5030
Z 95 WATER TRANSPORT	.1804	.7700	-.3478	.0168	.0166	.1187	-.8875	-.0355	-.1683
Z 96 AIR TRANSPORT	.0997	.6931	-.2653	.0169	.0071	.0625	-.5664	-.0226	.0250
Z 97 COMMUNICATION	.0588	.2639	-.1629	.0117	.0017	.0340	-.3711	-.0128	-.1767

SIZE 273 BY 8

ROW / COLUMN	FD 1	FD 2	FD 3	FD 4	FD 5	FD 6	FD 7	FD 8	ROW TOTALS
Z 98 BANKING	.0909	.4545	-.2658	.0075	.0084	.0739	-.4400	-.0381	-.1088
Z 99 FINANCE & LIFE INS	.0684	.3572	-.3667	.0017	.0028	.0315	-.1445	-.0145	-.0637
Z 100 OTHER INSURANCE	.0843	.4528	-.4052	.0052	.0059	.0598	-.3258	-.0273	-.1504
Z 101 INVESTMENT, REAL EST	.0866	.4909	-.2403	.0077	.0112	.0803	-.4721	-.0300	-.0657
Z 102 OTHER BUSINESS SERV	.1688	.5076	-.2303	.0075	.0096	.0768	-.4618	-.0338	.0445
Z 103 OWNERSHIP OF DWELLG	0.0000*	0.0000*	0.0000*	0.0000*	0.0000*	0.0000*	0.0000*	0.0000*	0.0000*
Z 104 PUBLIC ADMIN	.0160	.0304	-.0194	.0002	.0008	.0020	-.0304	-.0019	-.0021
Z 105 DEFENCE	0.0000*	0.0000*	0.0000*	0.0000*	0.0000*	0.0000*	0.0000*	0.0000*	0.0000*
Z 106 HEALTH	.3013	.7116	-.1894	.0001	.0002	.0349	-.1605	-.0078	.6903
Z 107 EDUCATION, LIBRARIES	.1974	.2567	-.0118	-.0000	.0010	.0048	-.0306	-.0026	.4149
Z 108 WELFARE SERVICES	.1762	.4900	-.1050	.0028	.0034	.0288	-.2103	-.0181	.3678
Z 109 ENTERTAINMENT	.0477	.6666	-.1991	.0049	.0047	.0399	-.3078	-.0275	.2294
Z 110 RESTAURANTS, HOTELS	.0086	.4139	-.0700	.0005	.0008	.1380	-.5502	-.0165	-.0749
Z 111 PERSONAL SERVICES	.0115	.2852	-.0967	.0006	.0009	.0171	-.9926	-.0310	-.8051
Z 112 BUSINESS EXPENSES	.0991	.4799	-.2134	.0087	.0097	.0829	-.4924	-.0429	-.0686
Z 113 NON-COMPETING IMPORTS	0.0000*	0.0000*	0.0000*	0.0000*	0.0000*	0.0000*	0.0000*	0.0000*	0.0000*
AGRICULTURAL COMMODITY OUTPUTS									
XA 1 WOOL	.1968	1.0407	-.4761	.0159	.0187	.2328	-.9490	-.3089	-.2691
XA 2 SHEEP	.2684	1.4321	-.6597	.0221	.0261	.4654	-1.3750	-.4193	-.2399
XA 3 WHEAT	.1996	1.0433	-.4978	.0173	.0223	.0974	-1.0216	-.3661	-.5057
XA 4 BARLEY	.1850	.9712	-.4532	.0157	.0193	.1466	-.9426	-.3140	-.3720
XA 5 OTHER CEREAL GRAINS	.0297	.1544	-.0614	.0024	.0015	.0440	-.1679	-.0000	-.0854
XA 6 MEAT CATTLE	.2810	1.4980	-.6904	.0231	.0275	.4913	-1.4335	-.4353	-.2389
XA 7 MILK CATTLE	.1065	.5683	-.2621	.0088	.0103	.1776	-.5516	-.1679	-.1101
XA 8 OTHER FARMING EXPORT	.3496	1.7825	-.7874	.0296	.0333	.2635	-1.8083	-.3482	-.4855
XA 9 OTHER FARMING IMPORT COMP	.0820	.4691	-.2204	.0070	.0081	.1008	-.5015	-.1604	-.2152
AGRICULTURAL COMMODITY PRICES (BASIC VALUES)									
PA 1 WOOL	-.0686	-.2882	.1239	-.0051	-.0057	-.1067	.1908	.3038	.1443
PA 2 SHEEP	.3963	2.2514	-1.0608	.0349	.0418	1.4056	-2.5573	-.1412	.3706
PA 3 WHEAT	.1637	.9280	-.4760	.0166	.0237	.1365	-1.1840	.0200	-.3715
PA 4 BARLEY	.1677	.9533	-.4850	.0170	.0242	.1349	-1.2189	.0199	-.3869
PA 5 OTHER CEREAL GRAINS	.2266	1.2506	-.6267	.0220	.0306	.1757	-1.5021	-.0719	-.4952
PA 6 MEAT CATTLE	.3218	1.7996	-.8539	.0286	.0348	.8220	-2.0130	-.1079	.0319
PA 7 MILK CATTLE	-.2796	-1.3712	.6170	-.0222	-.0264	-.0066	1.0801	.7848	.7759
PA 8 OTHER FARMING EXPORT	.0993	.4842	-.1855	.0111	.0096	.0339	-.8640	.5674	.1560
PA 9 OTHER FARMING IMPORT COMP	-.2446	-1.1153	.4806	-.0180	-.0222	-.1011	.7109	.6409	.3312
INDUSTRY RATES OF RETURN									
R 1 PASTORAL ZONE	3.2	17.	-7.6	.30	.63	3.6	-17.	-1.7	-1.4
R 2 WHEAT/SHEEP ZONE	3.4	18.	-8.3	.34	.61	3.4	-18.	-1.7	-2.5
R 3 HIGH RAINFALL ZONE	4.6	25.	-11.	.43	.77	5.8	-25.	-2.9	-2.2
R 4 NORTHERN BEEF	5.1	28.	-13.	.49	.87	7.7	-28.	-3.5	-2.3
R 5 MILK CATTLE	1.9	10.	-4.7	.21	.44	3.3	-11.	1.1	1.5
R 6 OTHER FARMING EXPORT	6.9	36.	-16.	.66	1.0	5.0	-38.	-.45	-4.4
R 7 OTHER FARMING IMPORT COMP	1.4	8.6	-3.9	.17	.42	1.7	-10.	1.2	-.46

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SIZE 273 BY 8

ROW / COLUMN	FD 1	FD 2	FD 3	FD 4	FD 5	FD 6	FD 7	FD 8	ROW TOTALS
R 8 POULTRY	,5448	3,1925	-1,3980	,0888	,2138	,8869	-3,7597	2,2489	2,0179
R 9 SERVICES TO AGRICULTURE	.7973	4.5445	-2.3145	.1174	.2653	.9044	-5,7172	.9656	-.4370
R 10 FORESTRY	1,1	9,9	-4,5	,30	,58	1,4	-14,	1,9	-3.5
R 11 FISHING	6,0	31,	-14,	.61	.80	4,6	-28,	-4,5	-4,1
R 12 IRON	1,6630	8,4866	-3,7909	,1903	,2954	1,2104	-8,8971	-,2603	-1,1025
R 13 OTHER METALLIC MINERALS	3,5	16,	-6,7	,32	,45	2,2	-17,	-,50	-2,5
R 14 COAL	4,7	24,	-11,	,54	,60	3,4	-30,	-,85	-8,5
R 15 CRUDE OIL	,3886	2,3512	-1,2312	-,0047	,2882	,4196	,6783	-,4396	2,4502
R 16 NON-METALLIC MINERALS N.E	,4051	1,4885	-,8748	,0629	,2181	,2939	,0396	-,0734	1,5599
R 17 SERVICES TO MINING	-2,8924	-3,1008	,2674	,0415	,1643	-,1022	-,3818	,0197	-5,9843
R 18 MEAT PRODUCTS	1,3026	6,6224	-2,9877	,1392	,1967	-4,7843	-2,8474	-2,4364	-4,7949
R 19 MILK PRODUCTS	-,5620	-3,5348	1,4525	-,0203	,0610	-,4127	7,3210	-,0329	4,2718
R 20 FRUIT & VEG PRODUCTS	-,5551	-2,9475	1,2194	-,0192	,1458	-,4442	6,5547	-,0362	3,9175
R 21 MARGE, OILS & FATS	,0433	,1953	-,3857	,0716	,2028	,1500	1,0604	-,2445	1,0933
R 22 FLOUR & CEREAL PRODS	-,2670	-2,0160	,5244	,0261	,1791	-,0163	4,8482	-,2681	3,0105
R 23 BREAD, CAKES	-,3247	-2,4073	1,4408	,0178	,1391	-7,6626	3,5508	,0786	-5,1676
R 24 CONFECTIONERY	-,2235	-1,2100	,4537	,0134	,1402	-,1992	5,0376	-,0006	4,0115
R 25 FOOD PRODUCTS N.E.C.	4,7	25,	-11,	,43	,60	3,7	-22,	-4,7	-4,3
R 26 SOFT DRINKS, CORDIALS	-,5349	-4,6613	1,7454	-,0020	,1069	-,4006	5,6512	,0750	1,9798
R 27 BEER & MALT	-,5367	-1,2557	,9401	-,0221	,0472	,0227	2,8540	,0145	2,0640
R 28 ALCOHOLIC DRINKS N.E.C.	,1944	1,1891	-,5239	,0433	,1738	,2705	,0002	-,1136	1,2338
R 29 TOBACCO	-,7152	-1,9679	,8082	-,0115	,0523	-,1425	5,1331	-,0358	3,1208
R 30 PREPARED FIBRES	1,9558	9,9450	-4,7633	,1961	,3317	1,8267	-6,5671	-2,2230	,7020
R 31 MAN-MADE FIBRES, YARN	2,3	12,	-5,7	,23	,34	2,4	-12,	-,45	-,26
R 32 COTTON, SILK, FLAX	1,6907	9,2407	-4,1774	,1792	,3324	,9432	-8,7184	-,4471	-,9567
R 33 WOOL & WORSTED YARNS	,0494	,2489	-,2266	,0375	,1632	-3,6090	4,1131	-,0259	,7506
R 34 TEXTILE FINISHING	-,0928	-1,5653	,0406	,0345	,1838	-,5253	5,1531	,0092	3,4378
R 35 TEXTILE FLOOR COVERS	,0858	,6588	-,5201	,0475	,1045	-1,2901	-,1360	-,0742	-1,1239
R 36 TEXTILE PRODUCTS N.E.C.	,7515	3,4548	-1,6442	,0869	,1695	,6368	-2,0287	-,2387	1,1880
R 37 KNITTING MILLS	-,0488	-1,2642	,1551	,0389	,1193	-5,6349	3,0418	,0327	-3,5601
R 38 CLOTHING	,0261	-,9200	-,0154	,0354	,1354	-1,9138	4,0405	,0153	1,4037
R 39 FOOTWEAR	,4806	2,5081	-1,2653	,0645	,1308	,2423	,4943	-,0616	2,5938
R 40 SAWMILL PRODUCTS	,6921	2,1864	-1,2829	,0914	,1154	,4211	1,1754	-,2351	3,1638
R 41 PLYWOOD, VENEERS	,0609	,5938	-,3631	,0265	-,0161	,0879	1,2673	-,0466	1,6107
R 42 JOINERY & WOOD PRODS	-,0094	-1,2299	,1881	,0239	-1,1499	-,1222	,4361	,0043	-1,8591
R 43 FURNITURE, MATTRESSES	-,4560	-2,6161	1,0249	-,0119	-,5553	-,4129	2,4404	,0990	-,4880
R 44 PULP, PAPER	,4555	3,8127	-1,8229	,0671	,1488	,8323	-,9786	-,2528	2,2621
R 45 FIBREBOARD	,2301	,6471	-,4285	,0611	,1420	,0793	2,1678	-,3432	2,5556
R 46 PAPER PRODUCTS N.E.C.	.1944	,9679	-,5436	,0424	,1949	,0833	1,1736	-,2210	1,8919
R 47 NEWSPAPERS & BOOKS	,2901	-1,1340	-,2331	,0534	,1298	-1,4683	-,9108	-,1014	-3,3747
R 48 COMMERCIAL PRINTING	,1929	-,6586	,1136	,0522	,1302	-3,1103	1,1716	-,1013	-2,2097
R 49 CHEMICAL FERTILISERS	.6499	7,8344	-3,8635	.1409	.3086	2,3049	-6,1368	-3,2656	-2,0272
R 50 INDUSTRIAL CHEMICALS	2,1	13,	-6,4	,30	,47	2,4	-14,	-,65	-2,4
R 51 PAINTS, VARNISHES	-,3918	-2,0385	,5674	,0710	,1342	,1094	,6538	-,0542	-,9487
R 52 PHARMACEUTICALS	.3613	2,1955	-1,4630	,0715	,1409	,6027	-1,9529	-,3222	-,3662
R 53 SOAP & DETERGENTS	-,5088	-2,1021	,7099	,0132	,0847	,0203	1,9990	-,0034	,2128
R 54 COSMETICS, TOILETRY	-,1169	-,8255	,3902	,0255	,1311	,0246	,9637	-,0219	,5707
R 55 CHEMICAL PRODS N.E.C.	,9200	4,6906	-2,6731	,1087	,3174	,9923	-4,6324	-,2650	-,5414
R 56 OIL & COAL PRODUCTS	-,3789	3,1918	-2,2923	,0915	,1858	,9227	-2,4774	-1,0571	-1,8539
R 57 GLASS	.4032	2.5259	-1.2898	.0625	.1736	.4789	-.0391	-.1384	2.1769

SIZE 273 BY 8

ROW / COLUMN	FD 1	FD 2	FD 3	FD 4	FD 5	FD 6	FD 7	FD 8	ROW TOTALS
R 58 CLAY PRODUCTS	.2028	.4564	-.3565	.0417	.0788	.0969	2.8158	-.0130	3.3227
R 59 CEMENT	.0281	-.7118	.0475	-.0026	.1718	.0899	1.3751	.0266	1.0246
R 60 READY-MIXED CONCRETE	-.8463	-6.3260	1.9528	-.0386	-.0709	-.4645	5.9598	.1561	.3223
R 61 CONCRETE PRODUCTS	-.5788	-4.1628	1.3739	-.0129	-.1800	-.3290	5.7226	.1149	1.9478
R 62 NON-METAL MIN PRODS	-.0093	-.9356	.0565	.0437	-.4308	.0549	1.7641	.0111	.5546
R 63 BASIC IRON & STEEL	4.8	24.	-11.	.55	.60	3.3	-25.	-.74	-3.4
R 64 OTHER BASIC METALS	5.9	29.	-13.	.58	.72	4.0	-29.	-.87	-2.4
R 65 STRUCTURAL METAL	-.1932	-2.5966	.4806	-.2086	.1317	-.2089	1.1177	-.0411	-1.5185
R 66 SHEET METAL PRODS	-.8343	-5.0629	2.2111	-.2386	-.0169	-.6151	5.2156	-.1209	.5379
R 67 METAL PRODUCTS N.E.C.	.7174	2.7869	-1.4805	-.0148	.2608	.4986	-2.6054	-.1885	-.0262
R 68 MOTOR VEHICLES, PARTS	1.4766	7.5093	-3.6340	.1592	.2177	1.2069	-5.5835	-.3443	1.0080
R 69 SHIP & BOAT BUILDING	.9204	8.5587	-4.1814	-.0313	-.0827	1.1155	-5.7119	-1.4254	-.8382
R 70 LOCOMOTIVES	1.1999	6.7315	-3.0019	-.1439	.1359	.6794	-5.3211	.1199	.3996
R 71 AIRCRAFT BUILDING	.0725	.5799	-.5139	-.1441	.2709	.0895	-1.7599	-.0508	-1.4598
R 72 SCIENTIFIC EQUIPT	-.2365	-1.2728	.2225	-.0540	.1464	-.1722	1.0203	-.0536	-.3999
R 73 ELECTRONIC EQUIPT	.0874	1.2580	-.7839	-.0083	.1162	.1760	-.3623	.0080	.4911
R 74 HOUSEHOLD APPLIANCES	-.6015	-3.3926	1.4181	-.1256	.0040	-.5061	3.9411	.1037	.8412
R 75 ELECTRICAL MACHINERY	.2861	1.1604	-.8754	-.0387	.1982	.2844	-.9246	-.0808	.0096
R 76 AGRICULTURAL MACH.	2.3	11.	-5.8	.22E-01	.42	2.9	-12.	-.38	-1.7
R 77 CONSTRUCTION EQUIPT	.7495	2.9685	-1.8719	-.0890	.1937	.4493	-5.1772	-.1530	-2.9301
R 78 OTHER MACHINERY	.2406	.3718	-.7762	-.1390	.0786	.1392	-1.9234	-.1167	-2.1251
R 79 LEATHER PRODUCTS	.3912	1.1806	-.9984	.0627	.1800	.2780	1.0952	-.0679	2.1214
R 80 RUBBER PRODUCTS	.3213	1.8177	-1.1518	.0912	.1888	.4708	2.4065	-.2106	3.9338
R 81 PLASTIC PRODUCTS	.3192	1.1282	-.9320	.0582	.1192	.3294	.6574	-.1696	1.5180
R 82 SIGNS, WRITING EQUIPT	.2107	-.7737	-.1640	.0381	-.6498	-.0058	-.2074	-.1002	-1.6601
R 83 OTHER MANUFACTURING	.0510	-.4381	-.3622	-.0434	.0928	.0684	.5471	-.0867	-.1712
R 84 ELECTRICITY	.5752	3.8104	-1.5268	.0517	.3401	.6748	-6.4672	-.3357	-2.8775
R 85 GAS	-.4024	-1.8047	1.1315	-.0336	.1227	-.2973	.8572	.0496	-.3770
R 86 WATER, SEWERAGE	-.5973	-1.6761	.2510	-.0054	.2423	.1488	1.5982	-.2017	-.2401
R 87 RESIDENTIAL BUILDING	-.2545	-2.3143	.6082	-.0619	-1.0023	-.2547	2.0133	.0834	-1.1829
R 88 BUILDING N.E.C.	-.4882	-2.9015	.9400	-.0668	-.6856	-.3378	3.4718	.1314	.0632
R 89 WHOLESALE TRADE	.0687	-1.2796	.9406	.0417	.1384	.0985	-.8807	-.2815	-1.0739
R 90 RETAIL TRADE	-.5404	-3.6565	2.3924	.0043	.1353	-.8582	.6742	.0403	-1.7886
R 91 MOTOR VEHICLE REPAIR	-.0793	-.7550	.2799	-.0737	.1206	-.1113	-.8598	-.0888	-1.5658
R 92 OTHER REPAIRS	.1020	-.1351	.2898	-.1025	.2198	-.3020	-1.6082	-.1703	-1.7074
R 93 ROAD TRANSPORT	.5337	1.5373	-.9732	.0734	.1895	.4807	1.4365	-.3640	2.8338
R 94 RAILWAY TRANSPORT	.5505	2.6977	-.4323	.1487	.2102	.3663	-.7683	-.3190	2.4538
R 95 WATER TRANSPORT	-1.1300	1.6365	-.2925	.1817	.2054	.1197	.9321	-.0405	1.5525
R 96 AIR TRANSPORT	-.2792	-1.9640	.8028	-.0070	.0587	-.1929	.8026	.0114	-.6735
R 97 COMMUNICATION	-.1192	.1225	.6631	-.0567	.0932	-.0508	.5195	-.0061	1.1656
R 98 BANKING	.1104	.1316	2.2124	.0537	.1616	.1159	-1.7735	-.1101	.9020
R 99 FINANCE & LIFE INS	-.1338	-.4425	1.1160	.0337	.2203	.0084	-1.2695	-.0348	-.5022
R 100 OTHER INSURANCE	-.0067	-.3157	1.7698	.0407	.1377	.0390	-1.3525	-.0532	.2591
R 101 INVESTMENT, REAL EST	-.0896	-.4745	.7698	.0581	.2296	.2754	-2.6216	-.1137	-1.9665
R 102 OTHER BUSINESS SERV	-2.1278	-1.2526	.5514	.0414	.1381	.0787	-.8930	-.0718	-3.5357
R 103 OWNERSHIP OF DWELLG	-.0213	.3122	.0347	.0251	.3569	-.0972	-1.1290	-.0102	-.5288
R 104 PUBLIC ADMIN	-1.4454	-2.0730	1.6669	.0867	.2741	-.1534	.7732	.1018	-.8298
R 105 DEFENCE	-.1198	-.0637	.3966	.0228	.2894	-.1551	-.7854	.0388	-.3765
R 106 HEALTH	-.7817	-1.7764	.5910	.0260	.2669	-.2074	-.6081	.0179	-2.4719
R 107 EDUCATION, LIBRARIES	-3.2665	-4.0887	.2920	.0304	.2773	-.1632	-.6773	.0442	-7.5518

WAGE RELATIVITY EXPERIMENT

SIZE 273 BY 8

ROW / COLUMN	FD 1	FD 2	FD 3	FD 4	FD 5	FD 6	FD 7	FD 8	ROW TOTALS
R 108 WELFARE SERVICES	-1.3358	-3.1362	.5661	.0232	.2312	-.1909	-.2630	.0676	-4.0378
R 109 ENTERTAINMENT	-.0052	-1.9675	.3978	.0303	.2024	-.0131	-.8535	.0352	-2.1735
R 110 RESTAURANTS, HOTELS	-.1174	-2.3276	.4583	.0403	.2888	-.9306	1.5132	.0679	-1.0071
R 111 PERSONAL SERVICES	-.0579	-.4442	.1941	.0259	.1730	-.1353	.0652	.0561	.7770
R 112 BUSINESS EXPENSES	-8.5024	1.8974	-.6367	.0638	.3320	.1436	-2.8007	-.1149	-9.6179
R 113 NON-COMPETING IMPORTS	.0382	.3077	.0338	.0299	.2577	-.1161	7.8368	.0257	8.4136
RENTAL PRICES ON AGRICULTURAL LAND									
Q3 1 PASTORAL ZONE	.7923	4.2853	-1.9646	.0681	.0831	1.0847	-4.1399	-.6169	-.4079
Q3 2 WHEAT/SHEEP ZONE	.7700	4.1321	-1.9512	.0689	.0852	.9168	-4.2276	-.5603	-.7660
Q3 3 HIGH RAINFALL ZONE	1.1575	6.1626	-2.8385	.0980	.1169	1.6752	-6.0617	-.9528	-.6427
Q3 4 NORTHERN BEEF	1.1994	6.4622	-3.0168	.1053	.1290	2.1693	-6.6056	-1.0513	-.6085
Q3 5 MILK CATTLE	.2294	1.3384	-.6361	.0223	.0272	.8660	-1.5913	.4646	.7206
Q3 6 OTHER FARMING EXPORT	1.2461	6.3233	-2.7457	.1102	.1217	.8821	-6.8538	-.0399	-.9560
Q3 7 OTHER FARMING IMPORT COMP	.0770	.7271	-.3712	.0115	.0125	.2963	-1.3258	.5398	-.0527
EMPLOYMENT BY OCCUPATION									
N1 1 PROFESSIONAL W.C.	3.8855	-1.2132	.2443	-.0018	-.0134	.0237	.2666	-.0150	3.1767
N1 2 SKILLED W.C.	-.3446	6.0548	.2797	-.0084	-.0391	-.0505	.4327	-.0296	6.2950
N1 3 SEMI AND UNSKILLED W.C.	-.2114	-.8290	-1.8377	-.0059	-.0173	-.0583	.3766	-.0366	-2.6197
N1 4 SKILLED B.C. METAL & ELEC	.0724	.1861	-.1919	.1973	-.0798	.1255	.0511	-.0596	.3018
N1 5 SKILLED B.C. BUILDING	-.0748	-.7414	.1244	-.0355	1.1706	.0126	1.1335	-.0055	1.5840
N1 6 SKILLED B.C. OTHER	.0057	-.4607	.1439	.0028	.0028	6.6256	.8701	-.0979	7.0915
N1 7 SEMI AND UNSKILLED B.C.	-.0060	-.0081	-.0090	-.0052	-.0543	-.0298	-4.6465	-.0613	-4.9002
N1 8 RURAL WORKERS	.4431	2.4822	-1.1930	.0418	.0432	.5625	-2.4593	-1.0449	-1.1245
N1 9 ARMED SERVICES	-.0659	-.1950	.1737	-.0065	-.0056	-.0121	.2016	.0057	.0959
BALANCE OF TRADE (SA BILLION)									
BT 1	.0304	.1482	-.0643	.0030	.0031	.0251	-.1586	-.0127	-.0258
AGGREGATE IMPORTS (FOREIGN EXCHANGE)									
M 1	-.2153	-1.0842	.4557	-.0232	-.0261	-.1811	1.1046	.0102	.0407
AGGREGATE EXPORTS (FOREIGN EXCHANGE)									
E 1	.5834	2.8117	-1.2365	.0557	.0563	.4801	-3.0693	-.3324	-.6509
INVESTMENT PRICE INDEX									
IP 1	-.4316	-2.3532	1.0312	-.0529	-.1221	-.3212	2.3055	.0691	.1247
CONSUMER PRICE INDEX									
CP 1	-.5068	-2.6217	1.2089	-.0387	-.0453	-.4582	2.2307	.1065	-.1247
CR-IR									
FR 1	0.0000*	0.0000*	0.0000*	0.0000*	0.0000*	0.0000*	0.0000*	0.0000*	0.0000*

WAGE RELATIVITY EXPERIMENT

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SIZE 273 BY 8

ROW / COLUMN	FO 1	FO 2	FO 3	FO 4	FO 5	FO 6	FO 7	FO 8	ROW TOTALS
AGGREGATE EMPLOYMENT (HOURS)									
U1 1	.2045	.9930	-.4301	.0198	.0210	.1705	-1.0500	-.1029	-.1741
AGGREGATE EMPLOYMENT (PERSONS)									
U2 1	.0763	.6689	-.5684	.0171	.0176	.1982	-1.2971	-.1092	-.9968
GROSS NATIONAL PRODUCT									
GN 1	.1342	.6579	-.2862	.0132	.0140	.1125	-.6965	-.0663	-.1173
AGGREGATE CAPITAL STOCK									
K 1	0.0000*	0.0000*	0.0000*	0.0000*	0.0000*	0.0000*	0.0000*	0.0000*	0.0000*
AGGREGATE MONEY INVESTMENT									
IM 1	-.0316	-2.3532	1.0312	-.0529	-.1221	-.3212	2.3055	.0691	.1247
AGGREGATE MONEY CONSUMPTION									
CM 1	-.5068	-2.6217	1.2089	-.0387	-.0453	-.4582	2.2307	.1065	-.1247
ECONOMY WIDE RATE OF RETURN									
LM 1	1.0152	5.2682	-2.2026	.1381	.2641	.8985	-5.8957	-.3701	-.8845
COLUMN TOTALS	84.	.52E+03	-.25E+03	11.	25.	83.	-.49E+03	-48.	-65.

SIZE 102 BY 8

ROW / COLUMN	FO 1	FO 2	FO 3	FO 4	FO 5	FO 6	FO 7	FO 8	ROW TOTALS
EXPORT SUBSIDIES									
S1 2 SHEEP	.2530	1.4155	-.6639	.0226	.0269	1.1182	-1.6919	-.1074	.3731
S1 6 MEAT CATTLE	.2586	1.4256	-.6785	.0231	.0284	.7273	-1.6149	-.0948	.0749
S1 7 MILK CATTLE	-.1661	-1.4671	.6405	-.0322	-.0388	.1766	3.8798	.6313	3.6239
S1 8 OTHER FARMING EXPORT	-.0527	-.4023	.2148	-.0028	-.0055	-.0763	.1948	.4338	.3038
S1 9 OTHER FARMING IMPORT COMP	-.2446	-1.1153	.4806	-.0180	-.0222	-.1011	.7109	.6409	.3312
S1 10 POULTRY	-.2989	-1.5559	.7132	-.0244	-.0305	-.2134	1.4819	.3634	.4354
S1 11 SERVICES TO AGRICULTURE	-.4719	-2.3519	.9309	-.0307	-.0332	-.3405	1.6609	1.1055	.4690
S1 12 FORESTRY	-.5098	-2.1074	.9353	-.0307	-.0283	-.3027	1.5790	.4629	-.0017
S1 17 CRUDE OIL	-.4810	-2.3515	.9364	-.0705	-.0484	-.3111	3.6916	-.0069	1.3586
S1 18 NON-METALLIC N.E.C.	-.4344	-2.5178	1.0570	-.0404	-.0363	-.3319	3.2043	.0638	.9643
S1 19 SERVICES TO MINING	-1.2871	-3.4446	1.2472	-.0452	-.0454	-.3862	2.5160	.0772	-1.3681
S1 21 MILK PRODUCTS	-.3919	-2.0968	.9466	-.0339	-.0390	-.1769	2.2247	.4767	.9096
S1 22 FRUIT & VEG PRODUCTS	-.4231	-2.3159	1.0633	-.0388	-.0410	-.3268	2.4894	.1726	.5797
S1 23 MARGE, OILS & FATS	-.3599	-1.9081	.8667	-.0268	-.0321	-.2681	1.8438	.1018	.2173
S1 24 FLOUR & CEREAL PRODS	-.2908	-1.6121	.7445	-.0231	-.0288	-.2235	1.6596	.0447	.2705
S1 25 BREAD, CAKES	-.4276	-2.4067	1.1632	-.0345	-.0397	-1.5496	2.5157	.0960	-.6832
S1 26 CONFECTIONERY	-.4183	-2.3178	1.0659	-.0352	-.0403	-.3244	2.7575	.0929	.7803
S1 28 SOFT DRINKS, CORDIALS	-.4572	-2.6719	1.1877	-.0401	-.0441	-.3452	2.7374	.0926	.4592
S1 29 BEER & MALT	-.5187	-2.5616	1.2096	-.0438	-.0506	-.3838	2.6008	.0947	.3467
S1 30 ALCOHOLIC DRINKS N.E.C.	-.3891	-2.1795	1.0279	-.0310	-.0397	-.3075	2.0980	.1946	.3736
S1 31 TOBACCO	-.4704	-2.3948	1.1104	-.0352	-.0415	-.4147	2.2213	.1345	.1136
S1 33 MAN-MADE FIBRES, YARN	-.3471	-1.9736	.8758	-.0286	-.0334	-.4724	2.0557	.0531	.1296
S1 34 COTTON, SILK, FLAX	-.3668	-2.0584	.9268	-.0297	-.0341	-.8435	2.2728	.0794	-.0535
S1 35 WOOL & WORSTED YARNS	-.3847	-2.1421	.9576	-.0328	-.0401	-.9813	2.7677	.1391	.2834
S1 36 TEXTILE FINISHING	-.3590	-2.0414	.8694	-.0283	-.0330	-.4162	2.2689	.0541	.3866
S1 37 TEXTILE FLOOR COVERS	-.3956	-2.1969	.9810	-.0326	-.0394	-.9504	2.5250	.0823	-.0267
S1 38 TEXTILE PRODUCTS N.E.C.	-.3509	-2.0924	.9277	-.0284	-.0336	-.4111	2.4336	.0541	.4991
S1 39 KNITTING MILLS	-.4074	-2.4030	1.0553	-.0330	-.0392	-1.1678	2.6410	.0784	-.2755
S1 40 CLOTHING	-.4122	-2.5130	1.0632	-.0322	-.0385	-.9573	3.1802	.0791	.3693
S1 41 FOOTWEAR	-.4431	-2.5746	1.1370	-.0348	-.0427	-.4271	3.6405	.0763	1.3315
S1 42 SAWMILL PRODUCTS	-.4603	-2.6097	1.1405	-.0361	-.0700	-.3528	2.9891	.1812	.7819
S1 43 PLYWOOD, VENEERS	-.5173	-2.8314	1.2983	-.0411	-.1055	-.3809	2.9077	.1232	.4530
S1 44 JOINERY & WOOD PRODS	-.4680	-2.8383	1.2478	-.0377	-.2915	-.3741	2.5314	.0918	-.1387
S1 45 FURNITURE, MATTRESSES	-.4666	-2.7419	1.1816	-.0403	-.2549	-.4008	2.8351	.0915	.2037
S1 46 PULP, PAPER	-.4907	-2.5717	1.2087	-.0406	-.0494	-.3463	2.5355	.0885	.3341
S1 47 FIBREBOARD	-.4477	-2.4468	1.1059	-.0360	-.0422	-.3716	2.8319	.0629	.6565
S1 48 PAPER PRODUCTS N.E.C.	-.4701	-2.5256	1.1547	-.0384	-.0422	-.3867	2.7944	.0665	.5524
S1 49 NEWSPAPERS & BOOKS	-.4515	-3.2565	1.2779	-.0353	-.0399	-.9337	2.3940	.0713	-.9737
S1 50 COMMERCIAL PRINTING	-.4661	-2.9203	1.2861	-.0367	-.0444	-1.2810	2.9594	.0784	-.4246
S1 51 CHEMICAL FERTILISERS	-.3470	-1.4545	.6484	-.0262	-.0289	-.1469	1.5084	-.0710	.0824
S1 52 INDUSTRIAL CHEMICALS	-.4126	-1.6272	.6678	-.0234	-.0258	-.1724	1.3592	.0288	-.2056
S1 53 PAINTS, VARNISHES	-.4847	-2.5345	1.1208	-.0310	-.0429	-.3024	2.1115	.0598	-.1035
S1 54 PHARMACEUTICALS	-.5569	-2.6637	1.1373	-.0338	-.0387	-.3287	2.2584	.0525	-.1737
S1 55 SOAP & DETERGENTS	-.5330	-2.7036	1.2347	-.0373	-.0430	-.4069	2.4984	.0713	.0805
S1 56 COSMETICS, TOILETRY	-.5197	-2.8127	1.3343	-.0378	-.0450	-.3797	2.6593	.0752	.2698
S1 57 CHEMICAL PRODS N.E.C.	-.4743	-2.4758	1.0409	-.0404	-.0448	-.3049	2.3324	.0650	.0981
S1 58 OIL & COAL PRODUCTS	-.3388	-1.4522	.6320	-.0249	-.0246	-.2011	1.4727	.0081	.0713

SIZE 102 BY 8

ROW / COLUMN	FD 1	FD 2	FD 3	FD 4	FD 5	FD 6	FD 7	FD 8	ROW TOTALS
S1 59 GLASS	-.5018	-2.6557	1.1745	-.0456	-.0604	-.3486	3.1223	.0691	.7538
S1 60 CLAY PRODUCTS	-.4632	-2.7104	1.1816	-.0428	-.0618	-.3628	3.6468	.0741	1.2616
S1 61 CEMENT	-.4894	-2.7587	1.2365	-.0483	-.0497	-.3610	2.9402	.0742	.5438
S1 62 READY-MIXED CONCRETE	-.5044	-2.8954	1.2648	-.0464	-.0568	-.3729	3.2027	.0737	.6654
S1 63 CONCRETE PRODUCTS	-.5186	-2.9907	1.3030	-.0442	-.0889	-.3769	3.1610	.0788	.5235
S1 64 NON-METAL MIN PRODS	-.4802	-2.7695	1.2002	-.0398	-.1397	-.3692	2.9543	.0714	.4273
S1 67 STRUCTURAL METAL	-.4007	-2.3100	.9602	-.0700	-.0514	-.2986	2.0953	.0612	-.0139
S1 68 SHEET METAL PRODS	-.4260	-2.3708	1.0535	-.0631	-.0490	-.3209	2.2936	.0596	.1770
S1 69 METAL PRODUCTS N.E.C.	-.4004	-2.3612	1.0335	-.0618	-.0464	-.3160	2.2561	.0622	.1659
S1 70 MOTOR VEHICLES, PARTS	-.3217	-1.7980	.7878	-.0484	-.0430	-.2446	1.8094	.0472	.2688
S1 71 SHIP & BOAT BUILDING	-.4489	-2.4653	1.0403	-.0940	-.1426	-.3407	2.4016	.0416	-.0080
S1 72 LOCOMOTIVES	-.4331	-2.2970	1.0258	-.1188	-.0986	-.3493	2.7558	.0823	.5671
S1 73 AIRCRAFT BUILDING	-.4864	-2.7230	1.1531	-.0895	-.0592	-.3464	2.1685	.0724	-.3105
S1 74 SCIENTIFIC EQUIPT	-.5015	-2.8459	1.2787	-.0556	-.0443	-.3821	2.4170	.0721	-.0616
S1 75 ELECTRONIC EQUIPT	-.5040	-2.6891	1.1689	-.0569	-.0558	-.3493	2.5773	.0740	.1651
S1 76 HOUSEHOLD APPLIANCES	-.4542	-2.5541	1.1518	-.0613	-.0524	-.3451	2.4476	.0699	.2020
S1 77 ELECTRICAL MACHINERY	-.4200	-2.3097	1.0007	-.0544	-.0403	-.3072	2.1874	.0618	.1182
S1 78 AGRICULTURAL MACH.	-.4434	-2.5345	1.1244	-.0646	-.0469	-.3150	2.3380	.0641	.1220
S1 79 CONSTRUCTION EQUIPT	-.4506	-2.6190	1.1667	-.0626	-.0485	-.3414	2.2931	.0657	.0033
S1 80 OTHER MACHINERY	-.4528	-2.6623	1.1086	-.0843	-.0482	-.3434	2.1739	.0704	-.2380
S1 81 LEATHER PRODUCTS	-.3629	-2.2540	.9332	-.0301	-.0386	-.2953	2.7943	.0748	.8213
S1 82 RUBBER PRODUCTS	-.4361	-2.3577	1.0527	-.0566	-.0401	-.3356	2.7053	.0624	.6143
S1 83 PLASTIC PRODUCTS	-.4562	-2.4887	1.0647	-.0369	-.0412	-.3301	2.6058	.0600	.3774
S1 84 SIGNS, WRITING EQUIPT	-.4507	-2.8814	1.2062	-.0404	-.2153	-.3907	2.4491	.0729	-.2502
S1 85 OTHER MANUFACTURING	-.4533	-2.6694	1.1414	-.0546	-.0543	-.3531	2.4479	.0682	.0728
S1 86 ELECTRICITY	-.4731	-2.2638	1.0295	-.0557	-.0425	-.3066	1.7230	.0473	-.3419
S1 87 GAS	-.5673	-2.7658	1.4037	-.0639	-.0508	-.3931	2.5758	.0802	.2187
S1 88 WATER, SEWERAGE	-.6776	-3.1903	1.2914	-.0584	-.0942	-.3745	3.0990	.0667	.0621
S1 89 RESIDENTIAL BUILDING	-.4772	-2.8319	1.1808	-.0549	-.2735	-.3763	2.8055	.0963	.0687
S1 90 BUILDING N.E.C.	-.4976	-2.7845	1.1911	-.0558	-.1834	-.3771	3.0445	.0825	.4196
S1 91 WHOESALE TRADE	-.5691	-3.4878	1.7301	-.0441	-.0574	-.4537	2.6371	.0807	-.1641
S1 92 RETAIL TRADE	-.6617	-3.8249	2.0662	-.0463	-.0519	-.6919	2.5519	.0980	-.5607
S1 93 MOTOR VEHICLE REPAIR	-.4514	-2.7742	1.1519	-.1081	-.0882	-.3708	2.1739	.0706	-.3964
S1 94 OTHER REPAIRS	-.4526	-2.7698	1.3282	-.1009	-.0424	-.5112	2.1029	.0671	-.3786
S1 95 ROAD TRANSPORT	-.4302	-2.6102	1.1454	-.0395	-.0418	-.3471	3.4068	.0476	1.1311
S1 96 RAILWAY TRANSPORT	-.5283	-2.7728	1.4847	-.0580	-.0884	-.4166	3.8487	.0922	1.5616
S1 97 WATER TRANSPORT	-.9568	-2.4031	1.2237	-.0368	-.0462	-.3921	3.1826	.0736	.6450
S1 98 AIR TRANSPORT	-.4327	-2.4841	1.0526	-.0462	-.0361	-.3147	1.9498	.0654	-.2460
S1 99 COMMUNICATION	-.5474	-2.5730	1.4776	-.0850	-.0492	-.3772	2.8576	.0805	.7837
S1100 BANKING	-.5644	-3.1299	2.5670	-.0399	-.0443	-.4232	2.1673	.0806	.6172
S1101 FINANCE & LIFE INS	-.6693	-3.3880	2.1574	-.0391	-.0482	-.4492	2.2270	.0925	-.1129
S1102 OTHER INSURANCE	-.6108	-3.2123	2.2472	-.0387	-.0462	-.4458	2.2028	.0904	.1865
S1103 INVESTMENT, REAL EST	-.6349	-3.2742	1.6760	-.0375	-.0577	-.4080	2.1338	.0829	-.5195
S1104 OTHER BUSINESS SERV	-1.3715	-3.4636	1.6218	-.0395	-.0452	-.4417	2.4128	.0879	-1.2391
S1105 OWNERSHIP OF DWELLG	-.5404	-2.7202	1.2420	-.0413	-.0489	-.4338	2.2181	.0882	-.2362
S1106 PUBLIC ADMIN	-1.0797	-3.4789	1.8098	-.0429	-.0727	-.4374	2.9654	.1242	-.2122
S1107 DEFENCE	-.4068	-2.0456	.9601	-.0404	-.0533	-.3219	1.8660	.0701	.0282
S1108 HEALTH	-1.2643	-4.4168	1.6881	-.0411	-.0490	-.5131	2.5821	.1024	-1.9117
S1109 EDUCATION, LIBRARIES	-2.2636	-4.9401	1.3328	-.0406	-.0571	-.4713	2.4576	.1089	-3.8734
S1110 WELFARE SERVICES	-1.3694	-4.7863	1.5577	-.0461	-.0561	-.4963	2.7782	.1381	-2.2804

WAGE RELATIVITY EXPERIMENT

SIZE 102 BY 8

ROW / COLUMN	FD 1	FD 2	FD 3	FD 4	FD 5	FD 6	FD 7	FD 8	ROW TOTALS
S1111 ENTERTAINMENT	-.4869	-3.3638	1.3143	-.0392	-.0446	-.3920	2.1925	.1077	-.7120
S1112 RESTAURANTS, HOTELS	-.5241	-3.4606	1.3476	-.0412	-.0498	-.6785	3.4787	.1022	.1742
S1113 PERSONAL SERVICES	-.5095	-2.9736	1.3291	-.0408	-.0489	-.4171	3.6452	.1068	1.0912
S1114 BUSINESS EXPENSES	-.6816	-2.9521	1.5989	-.0424	-.0459	-.5051	2.3792	.0831	-.1660
S1115 NON COMPETING IMPORTS	-.5068	-2.6217	1.2089	-.0387	-.0453	-.4582	8.1207	.1065	5.7653
COLUMN TOTALS	-51.	-.26E+03	.12E+03	-4.4	-5.8	-40.	.25E+03	11.	20.

occupational wage rates are reproduced in this section (see Figure IV.1. page 58). If you punched "1" in column 76 of the printout steering card (see subsection III.4.1.(e)), and therefore included a title card in your deck (see subsection III.4.2.), then the title of your simulation will appear at the top of each page from this section until the end of your printout (see Figure IV.1 pages 58-68).

The next section of your printout contains the solution values for the basic solution endogenous variables in your experiment; that is, if you punch "999" in columns 6, 7 and 8 of the printout steering card (see subsection III.4.1.(b)). In our illustrative simulation we required the individual effects as well as the total effect on the endogenous variables for each of the shifts in occupational wage rates; that is, we punched a "0" in column 72 of the printout steering card (see subsection III.4.1.(c)). Therefore 9 columns of results have been printed out (see Figure IV.1. pages 59-68). The first 8 columns give the effects on the endogenous variables of each of the individual shifts in occupational wage rates, while the ninth column gives the total effect of the 8 shifts in occupational wage rates.

The final section of the printout contains the solution values for the back solution endogenous variables requested on the printout steering card (see subsection III.4.1.(b)). These will appear in the order in which they are listed in Table III.2, part B. In our illustrative simulation we have requested solutions for all of the backsolution endogenous variables. However, to conserve space, only the first of these, that is, export subsidies, has been included in Figure IV.1(see Figure IV.1. pages 66-68).

V. Concluding Remarks

Using this document, ORANI users should, via card input, be able to compute and print Johansen-style solutions to a wide range of model simulations. We plan to produce supplements to this document providing user-oriented documentation of other aspects of the ORANI computing systems. Two short supplements which explain how to operate the basic ORANI system via interactive terminals rather than card inputs, and how to produce results for a number of simulations from one basic solution will be available in the near future. Supplements on the computation of regional results,[1] on the computation of Euler-style solutions,[2] and on the addition of new equations and variables to the basic ORANI system are also to be written.

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1. See DPSV chapter 6.

2. See DPSV subsection 31.4 and 31.5.

APPENDIX : FORMATS USED IN THE ORANI 78 INPUT CARD DECK

To help ORANI users who are not familiar with FORTRAN format statements we include in this appendix details of how to punch input cards in all of the formats used in the ORANI card deck. Whenever data are required to be given by the user, the computer has been instructed by the ORANI computer program to read these data according to predetermined formats. The format statements for the ORANI computer input consist of combinations of the following:

- an "A" followed by an integer, say x (this means that the computer will read in up to x alphabetical characters from a field consisting of x columns on the card);
- an integer, say y, followed by an "X" (this instructs the computer to skip y spaces on the input data card);
- an "I" followed by an integer, say z, (this means that the computer will read in from a field of z columns, an integer of up to z digits long with the last digit being in the z^{th} column of its field);
- an "F" followed by two numbers with a decimal point separating them, say a.b (this means the computer will read, from an a-column field, a decimal number up to a digits long with the last b columns of the field taken as following the decimal point. Thus "012345" in F6.2 would read as 123.45.[1]

1. Alternatively, the decimal point could be explicitly included, i.e., we could punch "123.45".

A.1 Formats 11I5 and 16I5

Integers (of maximum length 5 digits each) are punched in formats 11I5 and 16I5 by punching each integer in a field of 5 coulmns (11 or 16 fields to the card respectively, thus using either the first 55 or the first 80 columns of the card) with the integer ending in the last column of its field. (See cards 13 and 36 for examples of 11I5 and 16I5 respectively).

A.2 Formats A2,8X,2I5 and A2,8X,3I5

Starting in column 1 punch up to 2 alphabetical characters, leave coulmns 3-10 blank then punch either 2 or 3 integers (maximum 5 digits each) in fields of five columns per field ending in the last column of each field. (See card 14 for an example of A2,8X,2I5 and card 56 for A2,8X,3I5 respectively).

A.3 Format 8(2X,2I4)

The 8 outside the brackets means repeat the format within the brackets 8 times. Therefore punch pairs of integer (maximum 4 digits per integer) in 8 fields, each of 10 columns (8 fields per card, thus using the first 80 columns of the card). Leave the first two columns of each field blank, punch the first of the pair of integers ending in column 6 of the field, and the second ending in column 10 of the field. (See, for example, card 14(c), page 33).

A.4 Format F10.3,2I5

Punch a decimal number in columns 1-10. (If the decimal point is included the number may be punched anywhere in the field. Alternatively you may omit the decimal point and punch the number so

that it ends in column 10. The last 3 digits will then be taken as being to the right of the (omitted) decimal point). Then punch 2 integers (maximum 5 digits each) ending in columns 15 and 20.

A.5 Formats 9F5.3; 10F5.2; F10.4 and 8F10.4

For format 9F5.3 punch 9 decimal numbers each in a field of 5 columns (i.e., use columns 1 - 45 only on the card). If the decimal point is included each number can be punched anywhere in its field. Otherwise omit the decimal point, end the number in the last column of its field and it will be read as having the last 3 digits to the right of the (omitted) decimal point.

Format 10F5.2 is similar to format 9F5.3 except now punch 10 decimal numbers each in a field of 5 columns (i.e., use columns 1-50 only on the card). Again if the decimal point is included each number can be punched anywhere in its field. If you decide to omit the decimal point, end the number in the last column of its field and it will be read as having the last 2 digits to the right of the (omitted) decimal point.

Format F10.4 is simply one decimal number punched in columns 1-10. (If the decimal point is included the number may be punched anywhere in the field. Alternatively, you may omit the decimal point and punch the number so that it ends in column 10. The last 4 digits will then be taken as being to the right of the (omitted) decimal point).

For format 8F10.4 follow the procedure as set out above for format F10.4 except repeat this procedure for 8 fields of 10 columns each.

A.6 Format 8 (I3, I2, F5.3)

Punch, in each of up to 8 fields of 10 columns, an integer (maximum 3 digits) ending in column 3 of the field, a second integer (maximum 2 digits) ending in column 5, and a decimal number in columns 6-10 of the field. If the decimal point is omitted, the last 3 digits in the field will be taken as being to the right of the (omitted) decimal point.

A.7 Format 8(I4,F6.4)

Punch, in each of up to 8 fields of 10 columns, an integer (maximum 4 digits) ending in column 4 of the field, and a decimal number in columns 5-10 of the field. (If the decimal point is omitted, the last 4 digits in the field will be read as being to the right of the (omitted) decimal point.)

A.8 Format A2

Punch up to 2 alphabetical characters beginning in column 1 of the card.

A.9 Format I3, 2X, 14I3, 23X, 5I2

Punch an integer (maximum 3 digits) ending in column 3; leave 2 blank columns; punch 14 integers (each maximum 3 digits) in columns 6-8, 9-11, .. , 45-47 (each integer ending in the last column of its 3 column field); leave 23 blank columns; punch 5 integers (maximum 2 digits each) in columns 71-72, 73-74, .. , 79-80 (each integer ending in the last column of its 2 column field.) See, for example, card 54, page 44.