Appendix B: Data and Identities for the Multicountry Model

The data for all the countries were obtained from the International Financial Statistics (IFS) tape (November 1982) and the Direction of Trade (DOT) tape (November 1982). The following steps were involved in the construction of the data base.

1. A program was written to read the IFS tape and create for each country all the variables in Table B-2 except the variables for which DOT data are needed: $M75\$A_i$, $M75\$B_i$, PM_i', $XX\$_{ij}$, $XX75\$_{ij}$, α_{ji}, and ψ_{2i}. Most of the work in constructing the data base was writing this program. Since no two countries were exactly alike with respect to the availability of the data, separate subroutines were written for each country. (Before these subroutines were written, a program was written to print the IFS data in a convenient format. The information needed to write the individual subroutines was taken from this printout. I am indebted to William Parke for help in writing the initial program that read the tape.) The individual treatment of the countries is discussed below. The output from this program was stored by country on a tape called IFS1.
2. A program was written to read the DOT tape and create the $XX\$_{ji}$ data (the bilateral trade data). The output from this program was stored by country on a tape called DOT1.
3. The IFS1 and DOT1 tapes were sorted to store the data by quarter. The sorted tapes were then used together to create the variables mentioned in step 1. This completed the construction of the data base.

The individual treatment of the data for each country is outlined in Table B-1. The comments in the table discuss any special treatment of the country. If no comments appear for a particular country, then all the data were available and nothing special needed to be done. Two standard procedures were followed for all the countries, and it is necessary to discuss these before considering the comments in Table B-1. First, if no quarterly National Income Accounts (NIA) data were available, quarterly data were interpolated

from annual data using quarterly data on the industrial production index (*IP*). If quarterly data on *IP* were not available, the procedure in Table B-6 was used to create the quarterly data. One can thus tell from Table B-1 how the quarterly NIA data were constructed (if they were) by noting whether or not *IP* data were available.

The second standard procedure concerns the construction of the Balance of Payments (BOP) data; this procedure is presented in Table B-7. The key variable that is created in this process is S_i^*, the balance of payments on current account. It is used in the construction of the asset variable, A_i^*, for each country. Quarterly BOP data do not generally begin as early as the other data, and the procedure in Table B-7 allows data on S_i^* to be constructed as far back as the beginning of the data for merchandise imports and exports ($M\$_i$ and $X\$_i$). When all data are available, the procedure is a way of linking the BOP and non-BOP data.

Most of the comments in Table B-1 are self-explanatory. Data for a variable were "made up" if there was a relatively small gap in an otherwise good series. In these cases the data were usually made up by linearly interpolating between the closest two available observations. In a few cases quarterly data on the consumer price index (*CPI*) were used for quarterly interpolations of annual data, and for France and Switzerland quarterly data on employment (*EMPL*) rather than on industrial production were used for the quarterly interpolation of the NIA data. For many countries only discount rate data were available for the short-term interest rate (*RS*), and these cases are mentioned in the table. For a few countries the NIA year began at a time other than January 1, and this had to be taken into account in the quarterly interpolations. These cases are also mentioned in the table. For a few countries data on real GNP (*Y*) were not available, but data on the nominal NIA variables were. In these cases, as indicated in the table, *CPI* data were used for the GNP deflator. Real GNP was then taken to be nominal GNP divided by the GNP deflator.

Quarterly population data were not available for any country, and the procedure in Table B-6 was used to construct quarterly from annual data. See in particular the note at the bottom of the table.

Quarterly DOT data began only in 1970I, and no attempt was made to construct DOT data before this quarter. Instead, the variables in the model were constructed in such a way (with one exception noted below) that no DOT data were needed in the estimation of the model. In other words, no DOT data were used for the estimates in Tables 4-1 through 4-13 in Chapter 4. This allowed the estimation periods for most countries to be much longer than would otherwise have been the case. The DOT data are needed, of

course, for the solution of the model, and therefore the earliest quarter for which the model can be solved is 1970I. In a few cases annual but not quarterly DOT data were available, and in these cases the procedure in Table B-6 was used to construct the quarterly data. In a few cases no DOT data existed, and in these cases the observations were assumed to be zero.

For a few countries no data on import prices were available, and for these countries the data were constructed as indicated in the fifth note to Table B-2. This construction required the existence of DOT data, and this is the exception mentioned in the previous paragraph where DOT data were needed for the estimation work. For countries for which DOT data were used in the construction of the import price index, the estimation period had to begin no earlier than 1970I for the equations that relied on these data.

The links to and from the US model are listed in Table B-5. The two key exogenous foreign sector variables in the US model are the real value of exports (EX) and the import price deflator (PIM). When the US model is embedded in the overall model, these two variables become endogenous. The US endogenous variables in Table A-4 that affect the rest of the model are the real value of imports (IM), the bill rate (RS), the GNP deflator ($GNPD$), real GNP ($GNPR$), and the demand pressure variable (ZZ). The data base for the US model is different from the data base for the United States on the IFS tape (among other things, the real variables in the US model are in 72$, whereas the real variables for the United States on the IFS tape are in 75$), and the δ_i variables in Table B-5 are used to link the two data sets. As noted in the table, when the US model is part of the MC model, the equation determining PEX is no longer Eq. 32 in Table A-5. Instead, Eq. 11 in Table 4-12 for the United States is used to determine PX_1, and PEX is then linked to PX_1.

The sample periods that were used for the estimation work are listed in the tables in Chapter 4. The beginning of the sample period was usually taken to be four quarters after the beginning of the data, and the end of the sample period was usually taken to be the last quarter of the data. One can thus tell from the tables in Chapter 4 approximately how many observations are available for each country.

TABLE B-1. Individual treatment of the data per country

Country	Local currency	Quar. NIA data?	Comments
1. United States	U.S. Dollars (mil.)	yes	See Appendix A.
2. Canada	Can. Dollars (mil.)	yes	Splice in M1* series at 673.
3. Japan	Yen (bil.)	yes	RB from 681.
4. Austria	Schillings (bil.)	yes	Discount rate data for RS. RB from 701. Made up quarterly data from annual data for PX and PM for 611-633.
5. Belgium	Bel. Francs (bil.)	no	Made up quarterly data from annual data for RB for 631-633.
6. Denmark	Den. Kroner (bil.)	no	Discount rate data for RS prior to 721.
7. France	Fr. Francs (bil.)	most	Interpolated data for IFS71IV for 571-614 using IFS73. Quarterly interpolations for NIA data prior to 651 using EMPL.
8. Germany	D. Mark (bil.)	yes	---
9. Italy	Lire (bil.)	most	Discount rate data for RS prior to 711. Quarterly C, ΔV, and G data interpolated using quarterly Y data for 601-694 and 811-814.
10. Netherlands	Guilders (bil.)	no	---
11. Norway	Nor. Kroner (bil.)	no	Discount rate data for RS prior to 714.
12. Sweden	Swe. Kroner (bil.)	some	Discount rate data for RS prior to 743. Made up quarterly data from annual data for M1* for 571-594. Some quarterly interpolations for NIA data; used EMPL prior to 691 and Y thereafter.
13. Switzerland	Swiss Francs (bil.)	no	Discount rate data for RS. EMPL used for quarterly *interpolations for NIA data. Made up quarterly* data from annual data for PX and PM for 601-604.
14. United Kingdom	U.K. Pounds (mil.)	yes	---
15. Finland	Markkaa (mil.)	some	Discount rate data for RS. No RB.
16. Greece	Drachmas (bil.)	no	Discount rate data for RS. No F. No RB. Table B-6 procedure for PM for 571-594.
17. Ireland	Irish Pounds (mil.)	no	Discount rate data for RS prior to 702. No F.
18. Portugal	Escudos (bil.)	no	Discount rate data for RS. No F. No PX. Made up data for RB for 742-754. Made up quarterly data from annual data for IP for 743 and 744. PY data for PX.
†19. Romania	Lei	no	Only e data collected from IFS.
20. Spain	Pesetas (bil.)	no	Discount rate data for RS. No RB.
21. Turkey	Liras (bil.)	no	Discount rate data for RS. No F. No RB. No IP. PX and PM from 681 on.
22. Yugoslavia	Dinars (bil.)	no	No RS. No F. No RB. Quarterly PX and PM data interpolated using quarterly CPI data.
23. Australia	Aust. Dollars (mil.)	yes	---
24. New Zealand	N.Z. Dollars (mil.)	no	Discount rate data for RS. No F. No IP. NIA year *begins April* 1.
25. South Africa	Rand (mil.)	yes	No F.
†26. Algeria	Alg. Dinars (mil.)	no	No RS. No F. No RB. No IP. No PM. Made up quarterly data from annual data for IFS70 for 711-713 and for IFS71V for 711-733. PX data from 721.
†27. Indonesia	Rupiahs (bil.)	no	No RS. No F. No RB. No IP. No PM. No ΔV. CPI to deflate IM.
†28. Iran	Rials (bil.)	no	Discount rate data for RS. No F. No RB. No IP. No PM. NIA year begins March 21. No VI. CPI to deflate IM.
†29. Iraq	Iraq Dinars (mil.)	no	No RS. No F. No RB. No IP. No PM. CPI to deflate IM.
†30. Kuwait	Ku. Dinars (mil.)	no	No RS. No F. No RB. No IP. No PM. NIA year begins April 1.
31. Libya	Lib. Dinars (mil.)	no	No RS. No F. No RB. No IP. No PM. CPI to deflate IM.
32. Nigeria	Naira (mil.)	no	Discount rate data for RS. No F. No RB. No PM. CPI to deflate IM. No ΔV. NIA year begins April 1.
33. Saudi Arabia	Riyals (bil.)	no	No RS. No F. No RB. No IP. No PM. CPI to deflate IM. Table B-6 procedure for IFS71IV for 571-674 and 721-734. NIA year begins July 1.
†34. United Arab Emirates	Dirham (bil.)	no	No RS. No F. No RB. No IP. No PM. No BOP data.
35. Venezuela	Bolivares (mil.)	no	Discount rate data for RS. No F. No RB. No PM. No IP. CPI to deflate IM.
36. Argentina	Arg. Pesos (bil.)	no	No RS. No F. No RB. No PM. No PX. CPI to deflate IM. PY data for PX.

(continued)

TABLE B-1 (continued)

Country	Local currency	Quar. NIA data?	Comments
37. Brazil	Cruzerios (bil.)	no	Discount rate data for RS prior to 711. No F. No RB. PM from 721 on. CPI to deflate IM. Set $\Delta V = 0$ for 801-804. IFS71V for 711-784 interpolated using IFS71.VO.
38. Chile	Chile Pesos (mil.)	no	No RS. No F. No RB. PX from 754 on. Made up quarterly data from annual data for M$ for 671-674. Set $\Delta V = 0$ for 771-774. PY to deflate EX. PY data for PX prior to 754.
39. Colombia	Col. Pesos (mil.)	no	Discount rate data for RS. No F. No RB. No IP. IFS70..D for X$ from 781 on.
40. Mexico	Mex. Pesos (bil.)	no	No RS. No F. No RB. No PM. No PX. CPI to deflate IM. PY data for PX.
41. Peru	Soles (bil.)	no	Discount rate data for RS. No F. No RB. No IP. No PM. CPI to deflate IM. PY data for PX for 601-624 and 783 on.
†42. Egypt	Egy. Pounds (mil.)	no	Discount rate data for RS. No F. No RB. No IP. No PM. No PX. CPI to deflate IM. PY data for PX.
43. Israel	Isr. Pounds (mil.)	yes	No RS. No F. No RB. No ΔV.
44. Jordan	Jor. Dinars (mil.)	no	Discount rate data for RS. No F. No RB. No Y data. Used CPI data for PY. Table B-6 procedure for PX and PM.
†45. Lebanon	Leb. Pounds (mil.)	no	Only data on e, MP*, X$, and POP.
46. Syria	Syr. Pounds (mil.)	no	No RS. No F. No RB. No IP. Table B-6 procedure for PX and PM. Set $\Delta V = 0$ prior to 701.
†47. Bangladesh	Taka (mil.)	no	No RS. No F. No RB. No IP. No PX. No PM.
†48. Republic of China (Taiwan)	N.T. Dollars (bil.)	no	Eliminated from the IFS and DOT tapes.
†49. Hong Kong	H.K. Dollars (bil.)	no	Only X$ data collected from IFS.
50. India	Ind. Rupees (bil.)	no	No F. NIA year begins April 1.
51. Korea	Won (bil.)	yes	Discount rate data for RS. No F. No RB. PY to deflate C.
52. Malaysia	Ringgit (mil.)	no	No RS. No F. No RB. PY to deflate IM for 701-704. No ΔV.
53. Pakistan	Pak. Rupees (mil.)	no	No F. NIA year begins July 1.
54. Philippines	Phil. Pesos (mil.)	no	Discount rate data for RS. No F. No RB.
†55. Singapore	Sing. Dollars (mil.)	no	No RS. No F. No RB. No EX. No IM.
56. Thailand	Baht (bil.)	no	Discount rate data for RS. No F. No RB. No IP.
†57. Bulgaria		no	No IFS data.
†58. China (Mainland)		no	No data collected from IFS.
†59. Cuba		no	No IFS data.
†60. Czechoslovakia		no	No IFS data.
†61. E. Germany		no	No IFS data.
†62. Hungary		no	No data collected from IFS.
†63. Poland		no	No IFS data.
†64. USSR		no	No IFS data.
†65. Rest of World		no	No IFS data.

Note: † No estimated equations for this country.

TABLE B-2. The variables for country i in alphabetical order

Equation number	Variable	Description
18	A_i^*	= net stock of foreign security and reserve holdings, end of quarter, in lc. [$= A_{i-1}^* + S_i^*$. Base value of zero was used for the quarter prior to the beginning of the data.]
2	C_i	= personal consumption in 75 lc. [IFS96F/CPI_i.]
	$^{\dagger\dagger}CPI_i$	= consumer price index, 1975 = 1.0. [= (IFS64 or IFS64X)/100.]
	$^{\dagger}e_{i75}$	= average exchange rate in 1975, lc per $. [= IFSRF for 1975.]
9b	e_i	= exchange rate, average for the quarter, lc per $. [= IFSRF.]
20	ee_i	= exchange rate, end of quarter, lc per $. [= IFSAE.]
	$^{\dagger\dagger}EMPL_i$	= industrial or manufacturing employment index, 1975 = 100. [IFS67 or various 67 options.]
15	EX_i	= total exports (NIA) in 75 lc. [= (IFS90C or IFS90N)/PX_i.]
	$^{\dagger}EXDIS_i$	= discrepancy between NIA export data and other export data in 75 lc. [$= EX_i - e_{i75}X75\$_i - XS_i$.]
10b	F_i	= three-month forward rate, lc per $. [= IFSB.]
	$^{\dagger}G_i$	= government purchases of goods and services in 75 lc. [= (IFS91F or IFS91FF)/PY_{it}.]
3	I_i	= gross fixed investment in 75 lc. [= IFS93/PY_i.]
14	IM_i	= total imports (NIA) in 75 lc. [= IFS98C/PM_i.]
	$^{\dagger}IMDIS_i$	= discrepancy between NIA import data and other import data in 75 lc. [$= IM_i - M_i - MS_i$.]
	$^{\dagger\dagger}IP_i$	= industrial production index, 1975 = 100. [= IFS66 or various 66 options.]
1	M_i	= merchandise imports (fob) in 75 lc. [= IFS71V/PM_i.]
	$^{\dagger}MS_i$	= other goods, services, and income (debit) in 75 lc. BOP data. [= (IFS77ADD)$\cdot e_i$.]
	$^{\dagger\dagger}M\$_i$	= merchandise imports (fob) in $. [= IFS71V/$e_i$.] [Also equals $(PM_iM_i)/e_i$.]
19	$M75\$A_i$	= merchandise imports (fob) in 75$ from Type A countries. [$= \sum_j XX75\$_{ji}$.]
	$^{\dagger}M75\$B_i$	= merchandise imports (fob) in 75$ from Type B countries. [$= M_i/e_{i75} - M75\$A_i$.]
6	$M1_i^*$	= money supply in lc. [= IFS34 or IFS34..B.]
V	PM_i	= import price index, 1975 = 1.0. [IFS75/100.]
IV	PM_i'	= import price index from DOT data. [$= \{e_i \sum_j (PX\$_j XX75\$_{ji})\}/\{e_{i75} \sum_j XX75\$_{ji}\}$.]
	$^{\dagger}POP_i$	= population in millions. [= IFS99Z.]
VI	$PW\$_i$	= world price index, $/75$. [$= \sum_{j\neq i}^{*} (PX\$_j X\$_j) \;/\; \sum_{j\neq i}^{*} X\$_j$, where $\sum^*$ denotes summation that excludes Type B countries and countries 26-35.]
11	PX_i	= export price index, 1975 = 1.0. [= IFS74/100.]
III	$PX\$_i$	= export price index, $/75$. [= $(e_{i75}PX_i)/e_i$.]
5	PY_i	= GNP or GDP deflator, 1975 = 1.0. [= (IFS99A or IFS99B)/Y_i.]
8	RB_i	= long-term interest rate, percentage points. [= IFS61 or IFS61A.]
7a,7b	RS_i	= three-month interest rate, percentage points. [= IFS60, IFS60B, IFS60C, or IFS60X.]
17	S_i^*	= total net goods, services, and transfers in lc. Balance of Payments on current account. Savings of the country. [See Table B-7.]

(continued)

TABLE B-2 (continued)

Equation number	Variable	Description
	$^{\dagger}TT_i^*$	= total net transfers in lc. [See Table B-7.]
12	ΔV_i	= inventory investment in 75 lc. [= IFS93I/PY_i.]
13	V_i	= stock of inventories, end of quarter, in 75 lc. [= $V_{i-1} + \Delta V_i$. Base value of zero was used for the quarter prior to the beginning of the data.]
16	X_i	= final sales in 75 lc. [= $Y_i - \Delta V_i$.]
	$^{\dagger}XDIS_i$	= discrepancy in real NIA data (in 75 lc) due to use of different deflators. [= $X_i - C_i - I_i - G_i - EX_i + IM_i$.]
	$^{\dagger}XS_i$	= other goods, services, and income (credit) in 75 lc. BOP data. [= (IFS77ACD·e_i)/PX_i.]
	$^{\dagger}X\$_i$	= merchandise exports (fob) in \$. [= IFS70/e_i.]
	$^{\dagger\dagger}XX\$_{ij}$	= merchandise exports (fob) from i to j in \$. [DOT tape.] [$XX\$_{i65} = X\$_i - \sum_{j \neq 65} XX\$_{ij}$ and $XX\$_{65i} = M\$_i - \sum_{j \neq 65} XX\$_{ji}$.] [$XX\$_{ij} = 0$ if i = j.]
I	$XX75\$_{ij}$	= merchandise exports (fob) from i to j in 75\$. [= $(e_i XX\$_{ij})/(e_{i75} PX_i)$ if i is a Type A country; = 0 if i is a Type B country.]
II	$X75\$_i$	= merchandise exports (fob) in 75\$. [= $\sum_j XX75\$_{ij}$.] [Also equals $X\$_i PX\$_i$.] [Equals 0 and is not used if i is a Type B country.]
4	Y_i	= real GNP or GDP in 75 lc. [= IFS99A.P, IFS99B.P, IFS99A.R, or IFS99B.R.]
21	ZZ_i	= demand pressure variable. [= $\{(Y_i/POP_i)^* - (Y_i/POP_i)\}/(Y_i/POP_i)^*$. See equation (4.38) in Chapter 4 for the definition of $(Y_i/POP_i)^*$.]
	α_{ji}	= share of i's total merchandise imports from Type A countries imported from j in 75\$. [= $XX75\$_{ji}/M75\$A_i$.]
	$^{\dagger}\psi_{1i}$	= $((ee_i + ee_{i-1})/2)/e_i$.
	$^{\dagger}\psi_{2i}$	= $PM_i/PM_i^!$.

Notes:
- lc = local currency. All prices are in lc. e and F are in units of lc per \$.
- * denotes that the variable is in units of lc.
- † denotes exogenous variable.
- †† denotes that the variable is used only in the construction of the data.
- For countries with no PM data, PM_i was taken to be $PM_{it}^!$ (so that $\psi_{2i} = 1$) and M_{it} was taken to be $[e_i \sum_j (PX\$_j XX75\$_{ji})]/PM_i$. For these countries is it not the case that $M\$_i = (PM_i M_i)/e_i$ because the summation $\sum_j (PX\$_j XX75\$_{ji})$ is only over Type A countries. $M\$_i$ pertains to all countries.
- For the oil exporting countries (countries 26-35), CPI was used in place of PY to deflate IFS91F or IFS91FF for G_i, IFS93E for I_i, and IFS93I for ΔV_i.

TABLE B-3. The list of equations for country i

Stochastic equations

1.	$M_i = f_1(PY_i, PM_i, RS_i \text{ or } RB_i, Y_i, A^*_{i-1}, M_{i-1})$	[merchandise imports in 75 lc]
2.	$C_i = f_2(RS_i \text{ or } RB_i, Y_i, A^*_{i-1}, C_{i-1})$	[private consumption in 75 lc]
3.	$\Delta I_i = f_3(\Delta I_{i-1}, I_{i-1}, \Delta Y_{i-1}, \Delta Y_{i-2}, \Delta Y_{i-3}, \Delta Y_{i-4}, t)$	[change in gross fixed investment in 75 lc]
4.	$Y_i = f_4(X_i, V_{i-1}, Y_{i-1})$	[GNP in 75 lc]
5.	$PY_i = f_5(PM_i, ZZ_i, t, PY_{i-1})$	[GNP deflator]
6.	$M1^*_i = f_6(RS_i, PY_iY_i, t, M1^*_{i-1})$	[money supply in lc]
7a.	$RS_i = f_{7a}(RS_1, RS_8, P\dot{Y}_{i-1}, M\dot{1}^*_{i-1}, ZZ_i, A^*_i, A^*_{i-1}, t, RS_{i-1})$	[three-month interest rate]
7b.	$RS_i = f_{7b}(\text{same as 7a plus } P\dot{M}_{i-1}, e_i)$	[three-month interest rate]
8.	$RB_i = f_8(RS_i, RS_{i-1}, RS_{i-2}, RB_{i-1})$	[long-term interest rate]
9b.	$e_i = f_{9b}(e_8, PY_i, PY_1, RS_i, RS_1, ZZ_i, ZZ_1, \Delta A^*_{i-1}, \Delta A^*_{1-1}, e_{i-1})$	[exchange rate, average for the quarter]
10b.	$F_i = f_{10b}(ee_i, RS_i, RS_1)$	[three-month forward rate]
11.	$PX_i = f_{11}(PY_i, PW\$_i, e_i)$	[export price index]

Identities

12.	$\Delta V_i = Y_i - X_i$	[inventory investment in 75 lc]
13.	$V_i = V_{i-1} + \Delta V_i$	[stock of inventories in 75 lc]
14.	$IM_i = M_i + MS_i + IMDIS_i$	[total imports (NIA) in 75 lc]
15.	$EX_i = e_{i75} \cdot X75\$_i + XS_i + EXDIS_i$	[total exports (NIA) in 75 lc]
16.	$X_i = C_i + I_i + G_i + EX_i + IM_i + XDIS_i$	[final sales in 75 lc]
17.	$S^*_i = PX_i(e_{i75} \cdot X75\$_i + XS_i) - PM_i(M_i + MS_i) + TT^*_i$	[balance of payments on current account in lc]
18.	$A^*_i = A^*_{i-1} + S^*_i$	[net stock of foreign security and reserve holdings in lc]
19.	$M75\$A_i = M_i/e_i - M75\$B_i$	[merchandise imports in 75$ from Type A countries]
20.	$ee_i = 2\psi_{1i}e_i - ee_{i-1}$	[exchange rate, end of quarter]
21.	$ZZ_i = [(Y_i/POP_i)^* - (Y_i/POP_i)]/(Y_i/POP_i)^*$	[demand pressure variable]

Variables explained when the countries are linked together (Table B-4)

22.	$X75\$_i$	[merchandise exports in 75$]
23.	PM_i	[import price index]
24.	$PW\$_i$	[world price index]

TABLE B-4. Equations that pertain to the trade and price linkages among countries

I	$XX75\$_{ji} = \alpha_{ji} M75\$A_i$	[merchandise exports from j to i in 75$.] [=0 if j is a Type B country.]
II	$X75\$_i = \sum_j XX75\$_{ij}$	[merchandise exports of i in 75$.] [=0 if i is a Type B country.]
III	$PX\$_{it} = (e_{i75} PX_i)/e_i$	[export price index of i, $/75$.] [=0 if i is a Type B country.]
IV	$PM'_i = \frac{e_i \sum_j (PX\$_j XX75\$_{ji})}{e_{i75} \sum_j XX75\$_{ji}}$	[import price index of i from DOT data.]
V	$PM_i = \psi_{2i} PM'_i$	[import price index of i.]
VI	$PW\$_i = \frac{\sum^*_{j \neq i} (PX\$_j X\$_j)}{\sum^*_{j \neq i} X\$_j}$	[world price index facing i.]

Notes:
- α_{ji} = share of i's total merchandise imports from Type A countries imported from j in 75$.
- The determination of α_{ji} is explained in Section 4.2.6.
- $\sum^*$ denotes summation that excludes Type B countries and countries 26-35.

TABLE B-5. Links to and from the US model

A. When the US model is part of the MC model, equation 32 in Table A-5, which determines PEX, is dropped. Instead, equation 11 in Table 4-12 for the US is used to determine PX_1, and PEX is determined as:

$$PEX = \delta_3 PX_1 .$$

B. Relevant endogenous variables in the US model (see Table A-4):

IM = imports (NIA), B72$.

RS = three month bill rate, percentage points.

GNPD = GNP deflator, 1972 = 1.0.

GNPR = GNP, B72$.

ZZ = demand pressure variable.

Links from the endogenous variables in the US model to the variables that affect the rest of the world:

$$M75\$_1 = IM/\delta_2 - M75\$_1 - IMDIS_1 .$$ [merchandise imports in 75$ from Type A countries]

$$PY_1 = GNPD/\delta_6 .$$ [GNP deflator, 1975 = 1.0]

$$RS_1 = RS .$$ [three month interest rate]

$$Y_1 = GNPR/\delta_5 .$$ [real GNP in 75$]

C. Relevant exogenous variables in the US model:

EX = exports (NIA), B72$.

PIM = price deflator for imports (NIA), 1972 = 1.0.

Links from the rest of the world to the exogenous variables in the US model:

$$EX = \delta_1 EX_1 = \delta_1 (X75\$_1 + XS_1 + EXDIS_1) .$$

$$PIM = \delta_4 PM_1 .$$

D. New exogenous variables:

$$\delta_1 = EX/EX_1 = EX/(X75\$ + XS_1 + EXDIS_1) .$$

$$\delta_2 = IM/(M75\$A_1 + M75\$B_1 + MS_1 + IMDIS_1) = IM/IM_1 .$$

$$\delta_3 = PEX/PX_1 .$$

$$\delta_4 = PIM/PM_1 .$$

$$\delta_5 = GNPR/Y_1 .$$

$$\delta_6 = GNPD/PY_1 .$$

E. Other relevant equations:

$$M_1 = M75\$A_1 + M75\$B_1 .$$

$$S_1^* = PX_1(X75\$_1 + XS_1) - PM_1(M_1 + MS_1) + TT_1^* .$$

$$A_1^* = A_{1-1}^* + S_1^* .$$

TABLE B-6. Procedure used to create quarterly data from annual data when no quarterly interpolation variables were available

Let:

y_t = (observed) average value of the variable for year t,

y_{it} = (unobserved) average value of the variable for quarter i of year t (i = 1, 2, 3, 4).

Then:

(i) $y_{1t} + y_{2t} + y_{3t} + y_{4t} = \lambda y_t$,

where $\lambda = \begin{cases} 1 \text{ for flow variables (at quarterly rates)} \\ 4 \text{ for stock variables and price variables.} \end{cases}$

Assume that the annual data begin in year 1, and let $\lambda y_1 = a_1$, $\lambda y_2 = a_2$, $\lambda y_3 = a_3$, ... The key assumption is that the four quarterly changes within the year are the same:

(ii) $y_{1t} - y_{4t-1} = y_{2t} - y_{1t} = y_{3t} - y_{2t} = y_{4t} - y_{3t} = \begin{cases} \delta_2 \text{ for } t = 1, 2 \\ \delta_t \text{ for } t \geq 3 \end{cases}$.

Given (i) and (ii) for t = 1, 2, one can solve for y_{40} and δ_2 in terms of a_1 and a_2:

$$y_{40} = \frac{13}{32} a_1 - \frac{5}{32} a_2,$$

$$\delta_2 = \frac{a_2 - a_1}{16}.$$

Using y_{40} and δ_2, one can then construct quarterly data for years 1 and 2 using (ii). Given y_{42} from these calculations and given (i) and (ii) for t = 3, one can solve for δ_3 in terms of a_3 and y_{42}:

$$\delta_3 = \frac{a_3 - 4y_{42}}{10}.$$

Using y_{42} and δ_3, one can then construct quarterly data for year 3. One can then solve for δ_4 in terms of y_{43} and a_4, and so on.

Note: • The annual population data that were collected for the model are mid-year estimates. In order to apply the above procedure to these data, the assumption was first made that each mid-year value is the same as the average value for the year.

TABLE B-7. Construction of the balance of payments data: data for S_i^* and TT_i^*

Let:

$MS\$'_i$ = merchandise imports (fob) in \$, BOP data. [= IFS77ABD.]

$M\$_i$ = merchandise imports (fob) in \$. [In Table B-2.]

$X\$'_i$ = merchandise exports (fob) in \$, BOP data. [= IFS77AAD.]

$X\$_i$ = merchandise exports (fob) in \$. [In Table B-2.]

$MS\$_i$ = other goods, services, and income (debit) in \$. BOP data. [= IFS77ADD.]

$XS\$_i$ = other goods, services, and income (credit) in \$. BOP data. [= IFS77ACD.]

$PT\$_i$ = private unrequited transfers in \$. BOP data. [= IFS77AED.]

$OT\$_i$ = official unrequited transfers in \$. BOP data. [= IFS77AGD.]

A. When quarterly data on all the above variables were available, then:

(i) $S\$_i = X\$'_i + XS\$_i - M\$'_i - MS\$_i + PT_i + OT\$_i$,

(ii) $TT\$_i = S\$_i - X\$_i - XS\$_i + M\$_i + MS\$_i$,

where $S\$_i$ is total net goods, services, and transfers in \$ (balance of payments on current account) and $TT\$_i$ is total net transfers in \$.

B. When only annual data on $M\$'_i$ were available, interpolated quarterly data were constructed using $M\$_i$. Similarly for $MS\$_i$.

When only annual data on $X\$'_i$ were available, interpolated quarterly data were constructed using $X\$_i$. Similarly for $XS\$_i$, $PT\$_i$, and $OT\$_i$.

When no data on $M\$'_i$ were available, then $M\$'_i$ was taken to be $\lambda \cdot M\$_i$, where λ is the last observed annual value of M\$'/M\$. Similarly for $MS\$_i$ (where λ is the last observed annual value of MS\$/M\$).

When no data on $X\$'_i$ were available, then $X\$'_i$ was taken to be $\lambda \cdot X\$_i$, where λ is the last observed annual value of X\$'/X\$. Similarly for $XS\$_i$ (where λ is the last observed annual value of XS\$/X\$), for $PT\$_i$ (where λ is the last observed annual value of PT\$/X\$), and for $OT\$_i$ (where λ is the last observed annual value of OT\$/X\$).

Equations (i) and (ii) were then used to construct quarterly data for $S\$_i$ and $TT\$_i$.

C. After data on $S\$_i$ and $TT\$_i$ were constructed, data on S_i^* and TT_i^* were constructed as:

(iii) $S_i^* = e_i S\$_i$,

(iv) $TT_i^* = e_i TT\$_i$.

D. Notice from MS_i and XS_i in Table B-2 and from $MS\$_i$ and $XS\$_i$ above that

$$MS\$_i = (PM_i MS_i)/e_i,$$

$$XS\$_i = (PX_i XS_i)/e_i.$$

Notice also from Table B-2 that

$$M\$_i = (PM_i M_i)/e_i,$$

$$X\$_i = (e_{i75} PX_i X75\$_i)/e_i.$$

Therefore, from equations (ii)-(iv), the equation for S_i^* can be written

$$S_i^* = PX_i(e_{i75} X75\$_i + XS_i) - PM_i(M_i + MS_i) + TT_i^*,$$

which is equation 17 in Table B-3.

E. For countries with no PM data it is not the case that $M\$_i = (PM_i M_i)/e_i$. (See the fifth note to Table B-2.) For these countries TT_i^* was taken to be

$$TT_i^* = S_i^* - PX_i(e_{i75} X75\$_i + XS_i) - PM_i(M_i + MS_i),$$

where PM_i and M_i are defined in the fifth note to Table B-2.