IMPACT PROJECT

A Commonwealth Government inter-agency project in co-operation with the University of Melbourne, to facilitate the analysis of the impact of economic demographic and social changes on the structure of the Australian economy

THE MACRO MODULE DATA BASE

by

B. R. Bacon

and

R. J. Walters

Australian Bureau of Statistics
Canberra

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IMPACT RESEARCH CENTRE c/- Industries Assistance Commission, 608 St. Kilda Road, Melbourne, Victoria, 3004, Australia Area Code 03 Telephone 51-8611

14. Bank advances

$$\text{Dlog } A = \alpha_{15} (\log \hat{A} - \log A) + \beta_{24} \log \left[{}^{Py}/_{y^*} \, e^{\lambda_1 t} \right]$$

$$\log \hat{A} = A_0 + \log M + \beta_{25} \log r + \beta_{26} QA$$

15. Direct taxes

$$\log T_1 = \log (t_1 Py)$$

16. Indirect taxes

$$\log T_2 = \log (t_2 S\$)$$

$$S\$ = P (d + DK + DK_g) + P_x x + P_g g$$

17. Balance of payments

$$DR = P_x x - EP_i i + DF$$

18. Supply of money

$$DM = DR + P_g g + P (DK_g + DEP) + Pc - T_1 - T_2 - DB + DA + XM$$

19. Change in inventories

$$Dv = y + i - d - DK - x - g - DK_g + sd$$

20. Bond rate

$$\text{Dlog } r = \alpha_{16} \log {}^{r_0}/_{r} + \beta_{27} \log {}^{R}/_{M} - \beta_{28} \log (1 - UR) + \beta_{29} \log \left[{}^{M}/_{M_0 e^{(\lambda_1 + \lambda_2)t}} \right] + \beta_{30} QS$$

21. Exchange rate

$$\text{Dlog } E = \alpha_{17} \log {}^{E_0}/_{E} + \beta_{31} \log {}^{R}/_{M} + \beta_{32} QUS + \beta_{33} QER$$

22. Business fixed capital stock

$$\frac{DK}{K} = k$$

NOTE : (i) A subscript of zero indicates a constant.

(ii) ^ denotes the desired level.

(iii) D is the differential operator $\frac{d}{dt}$.

CONTENTS

7. Price of government goods and services

$$\text{Dlog } P_g = \alpha_8 (\log \hat{P}_g - \log P_g)$$

$$\log \hat{P}_g = \beta_{12} \log W + (1 - \beta_{12}) \log P$$

8. Price of exports

$$\text{Dlog } P_x = \alpha_9 (\log EP_i - \log P_x) + \beta_{13} \log ({}^{P}/_{EP_w}) + \beta_{14} QE$$

9. Average weekly earnings

$$\text{Dlog } W = \alpha_{10} [\log (1 - \beta_2) {}^{y}/_{L} - \log {}^{W}/_{P'}] + \beta_{15} \log \left({}^{W_A}/_{W_0} e^{\lambda_3 t} \right) + \gamma_3 (\log \hat{m} - \log {}^{M}/_{P})$$

$$\log P' = P_0 + \beta_{16} \log EP_w + (1 - \beta_{16}) \log P$$

10. Unemployment rate

$$\text{Dlog UR} = \alpha_{11} (\log \hat{UR} - \log UR)$$

$$\log \hat{UR} = UR_0 + \beta_{17} \log \left({}^{y}/_{y^*} e^{\lambda_1 t} \right) + \beta_{18} \log ({}^{Py}/_{WL})$$

11. Labour demand

$$\text{Dlog } L = \alpha_{12} [\log (1 - \beta_2) {}^{y}/_{L} - \log {}^{W}/_{P}]$$

12. Non-bank demand for government securities

$$\text{Dlog } B = \alpha_{13} (\log \hat{b} - \log {}^{B}/_{P})$$

$$\log \hat{b} = b_0 + \log y + \beta_{19} \log r - \beta_{19} \log r_w + \beta_{20} \log {}^{EP_w}/_{P}$$

13. Net capital inflow

$$\text{Dlog } F = \alpha_{14} (\log \hat{f} - \log F)$$

$$\log \hat{f} = f_0 + \log y + \beta_{21} \log r - \beta_{21} \log r_w + \beta_{22} QF + \beta_{23} EQZ + \beta_{34} \frac{EP_w}{P} QZ + \beta_{35} \log P_x x$$

APPENDIX V MACRO MODEL SPECIFICATION

1. Consumption expenditure

$$\text{Dlog } d = \alpha_1(\log \hat{d} - \log d) + \gamma_1(\log \hat{m} - \log {}^{M}/_{p})$$

$$\log \hat{d} = d_0 + \log (y - {}^{T_1}/_{p}) + c)$$

$$\log \hat{m} = m_0 + \log y + \beta_1 \log r$$

2. Net Private Investment

$$Dk = \alpha_2[\alpha_3(\beta_2 \, {}^{y}/_{K} - {}^{r}/_{4}) + \lambda_0 - k]$$

3. Exports

$$\text{Dlog } x = \alpha_4 (\log \hat{x} - \log x)$$

$$\log \hat{x} = x_0 + \lambda_4 t + \beta_3 \log ({}^{P_x}/_{EP_w}) + \beta_4 QE$$

4. Imports

$$\text{Dlog } i = \alpha_5 (\log \hat{i} - \log i) + \beta_5 (\log \hat{v} - \log v)$$

5. Output

$$\text{Dlog } y = \alpha_6 (\log \hat{y} - \log y) + \beta_6 (\log \hat{v} - \log v)$$

$$\hat{i} = \left(i_0 \left(\frac{EP_i(1+t_3)}{P} \right)^{\beta_7} e^{\beta_8 QE} \right) S$$

$$\hat{y} = \left(1 - i_0 \left(\frac{EP_i(1+t_3)}{P} \right)^{\beta_9} e^{\beta_{10} QE} \right) S$$

$$\hat{v} = v_0 S$$

$$S = d + DK + DK_g + x + g$$

6. Price of output

$$\text{Dlog } P = \alpha_7 (\log \frac{WL}{y} - \log P) + \gamma_2 (\log \hat{m} - \log {}^{M}/_{p}) + \beta_{11} (\log \hat{v} - \log v)$$

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1. INTRODUCTION

1.1 The MACRO Module of IMPACT

MACRO is a small medium- term macro-economic model of the Australian economy and is one of the three modules in the IMPACT Model, as described by Powell and Lawson [12]. MACRO is intended for simulation with the other two modules, ORANI (a general equilibrium model of industry structure) and BACHUROO (a demographic and labour supply model). This paper details the construction and characteristics of the data base required for the estimation and simulation of the MACRO module.

1.2 General Characteristics of the Data[1]

Both ORANI and BACHUROO are framed in terms of annual data, while, given the wider availability of quarterly data for the variables appearing within it, MACRO is estimated with quarterly data, and then translated into annual terms for solution with the other modules. In common with the RBA76 Model, MACRO is specified as a set of differential equations in continuous time framed in terms of the levels of stock variables and the rates of flow of

1. A detailed derivation and listing of the model data together with the model specification are given in the Appendices.

flow variables at one instant in time; the accuracy of the 'discretization' of the model into observable magnitudes is therefore improved if quarterly, rather than annual , data are used, and the degrees of freedom problem associated with FIML estimation is also reduced. Estimation with quarterly data will better capture short-run dynamics, by improving the estimation of relevant parameters which might be poorly determined if estimated with annual data.

The estimation methodology is detailed in Bacon and Johnston [4] and will not be discussed here except to emphasize the timing considerations which arise in processing the data. The continuous time specification implies that all variables are referred to at a single instant in time, and this requirement is reflected in the data used to estimate the discrete-time version of the model. Thus to adjust the timing of stock observations recorded on an 'end period' basis to accord with that of flow observations (which are conceptually timed at 'mid period'), an average of 'start period' and 'end period' values is applied to the stock data; that is, a simple first order moving average, given the acronym 'FORMA', is applied. A further FORMA is required to correctly time all stock variables thus processed and all flow variables with their first differences (which are conceptually timed at the beginning of the period). This second FORMA process is handled in two ways. If the variable is exogenous to the model then the FORMA is applied directly to the data. However, if the variable is endogenous to the model the FORMA is embedded as part of the coding for estimation.[1] The timing convention must also be observed when constructing the annual time series. (See Appendix III for a diagramatic representation of the process.)

1. A complete listing of the equations coding used in estimation is given in [5] , Appendix I.

	MRES	VRES
1958		
1959	-0.5577	-0.5655
1960	-0.5685	-0.6377
1961	-0.5810	-0.5695
1962	-0.5676	-0.5787
1963	-0.5786	-0.5891
1964	-0.5748	-0.5752
1965	-0.5915	-0.5960
1966	-0.6026	-0.5654
1967	-0.5921	-0.5643
1968	-0.6247	-0.5673
1969	-0.5716	-0.5546
1970	-0.6181	-0.5516
1971	-0.6216	-0.5705
1972	-0.5910	-0.6002
1973	-0.5921	-0.6670
1974	-0.6036	-0.6162
1975	-0.5566	-0.6029
1976	-0.5849	-0.6084

	K	g	Kg	WA	C	Q_2	t
1958	11610.		19277.			0.0	-1.
1959	11842.	1672.	19341.	0.9225	860.	0.0	0.
1960	12351.	1709.	19419.	0.9495	905.	0.0	1.
1961	12726.	1820.	19594.	0.9640	1002.	0.0	2.
1962	13191.	1910.	19772.	0.9700	1091.	0.0	3.
1963	13806.	1977.	20043.	0.9562	1111.	0.0	4.
1964	14617.	2143.	20482.	0.9590	1164.	0.0	5.
1965	15616.	2415.	21080.	0.9780	1215.	0.0	6.
1966	16551.	2581.	21708.	0.9845	1245.	0.0	7.
1967	17427.	2790.	22336.	1.0117	1302.	0.0	8.
1968	18426.	3013.	23029.	1.0372	1346.	0.0	9.
1969	19482.	3080.	23751.	1.0612	1446.	0.0	10.
1970	20588.	3167.	24479.	1.0720	1544.	0.0	11.
1971	21868.	3227.	25243.	1.1302	1661.	1.0	12.
1972	22670.	3300.	25966.	1.1457	1802.	1.0	13.
1973	23577.	3631.	26558.	1.1560	2004.	1.0	14.
1974	24474.	3740.	27352.	1.2580	2283.	1.0	15.
1975	25100.	4077.	28421.	1.3182	2852.	1.0	16.
1976	25642.	4352.	29132.	1.3295	3205.	1.0	17.

	QF	QS	t_1	t_2	QUS	t_3	P_W
1958	0.	0.			0.		
1959	0.	0.	0.1134	0.1162	0.	0.0733	0.8675
1960	0.	1.	0.1193	0.1193	0.	0.0797	0.8662
1961	0.	0.	0.1430	0.1119	0.	0.0739	0.8737
1962	0.	0.	0.1212	0.1114	0.	0.0801	0.8897
1963	0.	0.	0.1191	0.1081	0.	0.0807	0.9027
1964	0.	0.	0.1297	0.1059	0.	0.0798	0.9170
1965	0.	0.	0.1386	0.1089	0.	0.0755	0.9372
1966	0.	0.	0.1377	0.1088	0.	0.0746	0.9677
1967	0.	0.	0.1402	0.1098	0.	0.0756	0.9967
1968	0.	0.	0.1426	0.1118	0.	0.0776	1.0407
1969	0.	0.	0.1489	0.1111	0.	0.0830	1.0940
1970	0.	0.	0.1602	0.1094	0.	0.0893	1.1520
1971	0.	0.	0.1667	0.1097	0.	0.0894	1.2110
1972	0.	0.	0.1651	0.1095	0.	0.0953	1.2610
1973	4.	4.	0.1588	0.1077	-1.	0.0874	1.3352
1974	3.	0.	0.1981	0.1120	0.	0.0806	1.4682
1975	0.	0.	0.1886	0.1125	0.	0.0870	1.6045
1976	0.	0.	0.1954	0.1191	0.	0.0904	1.6865

	r_W	PL	QER	QA	QE	TRES	FRES
1958	0.0380		0.	0.	0.0		
1959	0.0427	1.0760	0.	0.	0.0	2.5228	-0.1767
1960	0.0388	1.0810	0.	0.	0.0	2.5360	-0.1420
1961	0.0406	1.0875	0.	2.	0.0	2.5345	-0.1307
1962	0.0387	1.0798	0.	0.	0.0	2.5353	-0.1899
1963	0.0414	1.0792	0.	0.	0.0	2.5429	-0.1724
1964	0.0414	1.0777	0.	0.	0.0	2.5424	-0.1687
1965	0.0443	1.1005	0.	0.	0.0	2.5362	-0.1280
1966	0.0465	1.1187	0.	0.	0.0	2.5352	-0.1475
1967	0.0536	1.1295	0.	0.	0.0	2.5337	-0.1860
1968	0.0565	1.1110	0.	0.	0.0	2.5332	-0.1231
1969	0.0686	1.1237	0.	0.	0.0	2.5308	-0.2112
1970	0.0597	1.1525	0.	0.	0.0	2.5273	-0.1341
1971	0.0562	1.2181	-1.	0.	0.0	2.5295	-0.0973
1972	0.0562	1.3271	-1.	0.	-1.0000	2.5272	-0.3918
1973	0.0636	1.5535	-1.	0.	-0.8125	2.5324	-0.1252
1974	0.0678	1.9201	1.	0.	0.8750	2.5295	-0.0114
1975	0.0719	2.1440	1.	0.	0.5625	2.5343	0.1320
1976	0.0721	2.1605	1.	0.	1.6500	2.5486	0.1971

The model is specified in non-linear form but log-linearized for estimation, so that the majority of the data enter the estimation in logarithms. It consists of 22 endogenous variables and 22 exogenous variables, with 6 identities; the estimation procedure utilises data beginning in 1958.3. Variables measured in real terms are measured at constant 1966-67 prices.

The data in the model are seasonally adjusted using the US Bureau of the Census package, X11-Q. This package extracts via an iterative procedure the trend and irregular components using moving averages to obtain seasonal factors which may vary over time. This method is less likely to leave residual seasonality compared to the Jonson et al. [10] method of adjustment in which fixed-weight additive seasonal factors are applied to the logarithmsof the series.

2. DATA CONSTRUCTION

2.1 General Considerations

The source data and definitions used to construct the MACRO module data base are detailed with references in Appendix I. Apart from the method of seasonal adjustment, the MACRO module data base differs from that of Jonson et al. [10] in several important respects. These differences are due to :

(i) the use of alternative measures of certain economic variables with consequential effects on other variables within the model;

(ii) the specification of the tax equations as identities with implicit average tax rates ; and

(iii) the modelling of the unemployment rate rather than the labour supply.

2.2 Financial Series

Volume of Money (M)

Building societies have become important financing institutions since the mid-1960's. Against their deposits they make loans for housing, and hence they play an important role in the credit creation process. Additionally, deposits with building societies are sufficiently liquid to be included as a component of a broadly defined money supply, M4.[1] The velocity of money defined in terms of net domestic product at market prices relative to M4 exhibits zero long-term growth over the period 1958 to 1976, whereas the velocity in terms of M3 increases markedly beyond 1968. The use of M4 as the measure of money supply is consistent with the zero long term growth for the velocity of money implicitly assumed in the model's structural relationship for desired real money balances, $\hat{m}$:

$$\log \hat{m} = m_0 + \log y + \beta_2 \log r \quad , \tag{2.1}$$

where y is net domestic product at market prices (the term $\log y$ representing transactions demand) and r is the government bond rate (the term $\beta_2 \log r$ representing speculative demand). Thus $y/\hat{m} = 1/\Theta r^{\beta_2}$ (where $m_0 = \log \Theta$), which is constant in the long term if r has zero growth.

Bonds (B)/Advances (A)

Given the adoption of the M4 definition of the money supply, permanent building societies are defined as part of the monetary sector. The bonds variable employed is then chosen as holdings of Australian government securities by the private non-monetary sector correspondingly defined. The private non-monetary sector includes the short-term money market. Likewise, advances are

1. Jonson et al. [10] employ M3, which excludes shareholder's funds and unsecured borrowing of permanent building societies.

APPENDIX IV ANNUAL MACRO DATA

	d	k	x	i	Y	P	P_q
1958							
1959	10773.	0.0199	2221.	2111.	12942.	0.8275	0.7390
1960	11445.	0.0422	2188.	2623.	14013.	0.8547	0.7912
1961	11353.	0.0299	2676.	2369.	13848.	0.8655	0.8075
1962	12032.	0.0359	2694.	2560.	14880.	0.8722	0.8280
1963	12785.	0.0456	2921.	2777.	15867.	0.8987	0.8497
1964	13522.	0.0571	3060.	3328.	16948.	0.9307	0.8995
1965	14089.	0.0661	3167.	3774.	17885.	0.9515	0.9357
1966	14540.	0.0582	3209.	3489.	18329.	0.9830	0.9712
1967	15386.	0.0516	3649.	3882.	19426.	1.0118	1.0250
1968	16254.	0.0558	3834.	4367.	20758.	1.0435	1.0705
1969	17410.	0.0558	4316.	4471.	22408.	1.0840	1.1350
1970	18243.	0.0552	4923.	4808.	23444.	1.1365	1.2245
1971	18906.	0.0603	5356.	4909.	24672.	1.2057	1.3860
1972	19847.	0.0360	5669.	4560.	25431.	1.2972	1.5170
1973	21264.	0.0392	5649.	5636.	27348.	1.4557	1.6720
1974	21844.	0.0373	5539.	7093.	27759.	1.6940	2.0830
1975	22391.	0.0252	5905.	5840.	27976.	1.9650	2.5437
1976	23254.	0.0213	6398.	6613.	29030.	2.2360	2.8935

	P_x	W	UR	L	B	F	A
1958					2644.	2959.	2440.0000
1959	0.9255	0.6968	0.0159	3625.6992	2761.	3077.	2587.0000
1960	0.9382	0.7534	0.0116	3735.0488	2860.	3293.	2975.8999
1961	0.8975	0.7727	0.0233	3752.0244	2853.	3534.	2933.7000
1962	0.9042	0.7956	0.0216	3809.4736	3047.	3607.	3175.8999
1963	0.9855	0.8244	0.0170	3918.5488	3285.	3776.	3499.2000
1964	1.0142	0.8670	0.0107	4059.1738	3401.	3964.	3979.3999
1965	0.9737	0.9233	0.0091	4207.1484	3508.	4310.	4519.3984
1966	1.0170	0.9673	0.0121	4311.5234	3821.	4538.	5076.6992
1967	0.9807	1.0283	0.0130	4419.1484	4032.	4806.	5806.3008
1968	0.9700	1.0876	0.0124	4542.0469	4279.	5497.	6637.6016
1969	0.9950	1.1796	0.0104	4690.2227	4283.	5528.	7573.0000
1970	0.9987	1.2763	0.0096	4867.2461	4484.	5878.	8402.5000
1971	0.9890	1.4388	0.0123	4947.6484	5126.	7112.	9634.1016
1972	1.1005	1.5698	0.0175	4984.3750	5504.	8217.	11599.1992
1973	1.3160	1.7940	0.0141	5095.1211	5262.	6679.	15351.6016
1974	1.5785	2.2338	0.0196	5233.5000	5344.	6403.	18111.5000
1975	1.7517	2.6883	0.0450	5190.5000	5779.	4896.	21158.6016
1976	1.8993	3.0704	0.0471	5184.8984	7486.	4424.	25393.8984

	T_1	T_2	R	M	V	$\bar{r}$	$\bar{n}$
1958			901.	6614.	4164.	0.0517	0.8930
1959	1215.	1447.	1045.	7138.	4284.	0.0502	0.8930
1960	1430.	1633.	782.	7404.	4852.	0.0555	0.8930
1961	1713.	1585.	1122.	7765.	4777.	0.0507	0.8930
1962	1572.	1680.	1162.	8385.	4981.	0.0449	0.8930
1963	1698.	1820.	1538.	9272.	5054.	0.0446	0.8930
1964	2050.	1989.	1626.	10353.	5531.	0.0495	0.8930
1965	2360.	2209.	1346.	10912.	5967.	0.0536	0.8930
1966	2478.	2350.	1352.	11804.	6063.	0.0522	0.8930
1967	2756.	2583.	1284.	12924.	6264.	0.0530	0.8930
1968	3085.	2871.	1366.	13944.	6772.	0.0526	0.8930
1969	3616.	3178.	1205.	15497.	7302.	0.0595	0.8930
1970	4270.	3461.	1523.	16552.	7734.	0.0681	0.8930
1971	4967.	3846.	2760.	18348.	7909.	0.0615	0.8400
1972	5444.	4265.	5072.	22487.	7445.	0.0530	0.7840
1973	6337.	5028.	4818.	27364.	7765.	0.0805	0.6720
1974	9356.	6318.	3681.	29889.	9279.	0.0950	0.7540
1975	10363.	7670.	2933.	36636.	8841.	0.1000	0.7960
1976	12691.	9465.	2927.	41439.	9031.	0.1041	0.9210

FLOWS	STOCKS	
	END OF PERIOD	MIDDLE OF PERIOD
d	B	P
k	F	P_g
x	A	P_x
i	R	W
y	M	UR
T_1	v	L
T_2	r	W_A
g	E	t_1
c	K	t_2
QF	K_g	t_3
QS	r_w	P_w
QUS	t	P_i
QER		
QA		
QE		
QZ		
TRES		
FRES		
VRES		
MRES		

defined as advances of the monetary sector to the private non-monetary sector. Advances therefore consist of savings and trading banks' 'loans, advances and bills discounted' (other than savings banks' lending for housing to building societies)[1] and loans to the short-term money market, plus permanent building societies' loans outstanding.[2] The trading banks' loans, advances and bills discounted series also includes some loans to government authorities, which it would be desirable to net out, but this has not been done.

2.3 Taxes

The equations for total income tax receipts (T_1) and total expenditure tax receipts (T_2) are identities specifying the level of taxes as the relevant tax base multiplied by the implicit average tax rate (t_1, t_2 respectively). Jonson et al. [10] combine an effective average personal tax rate and the statutory company income tax rate into a single income tax rate, and similarly combine the rates of sales tax on household durables, motor vehicles, and non-durables into a single expenditure tax rate; behavioural relations are then specified for T_1 and T_2 in terms of a tax base and the derived tax rates, subject to a partial adjustment hypothesis. However, little attention is paid to appropriate weights for the tax rates being combined, and additionally, Jonson et al. [10] consider only the customs duty, payroll and sales tax components of indirect taxes, which account for only some 40% of total indirect taxes;[3] this has implications for the money supply equation and residual, XM.

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1. After construction of the data it was discovered that, although no time series data are available, the majority of savings banks' lending for housing to building societies relates to terminating building societies and not permanent building societies. Thus, a better measure of advances would be one which included savings banks' lending for housing to building societies. This item will be included when the data base is updated.
2. Jonson et al. [10] omit building societies' lending, and bank lending to the short-term money market.
3. The principal indirect tax omitted is excise duty. Other omitted items include land tax, local government rates, liquor taxes, taxes on gambling and stamp duties.

In the MACRO data base, income tax receipts consist of personal income taxes plus company income taxes. Personal income taxes are seasonally adjusted, having first been divided by an index which corrects for changes to the personal income tax payments tax rates scale, and then re-multiplied by this index after seasonal adjustment. Smoothing out sudden changes in the series due to tax rate changes will result in a more reliable seasonal adjustment.

The tax bases employed are functions of variables in the model. The personal income tax base is real net domestic product (y) multiplied by the gross domestic product deflator (P). The expenditure tax base is a current dollar sales measure, S$, given by :

$$S\$ = d\,P + g\,P_g + x\,P_x + (\Delta K + \Delta K_g)\,P \quad , \tag{2.2}$$

where

- d = real household expenditure ;
- g = real government final consumption expenditure ;
- x = real exports of goods and services ;
- P_g = government final consumption expenditure deflator ;
- P_x = exports deflator ;
- K = stock of real private capital ;
- K_g = stock of real government capital .

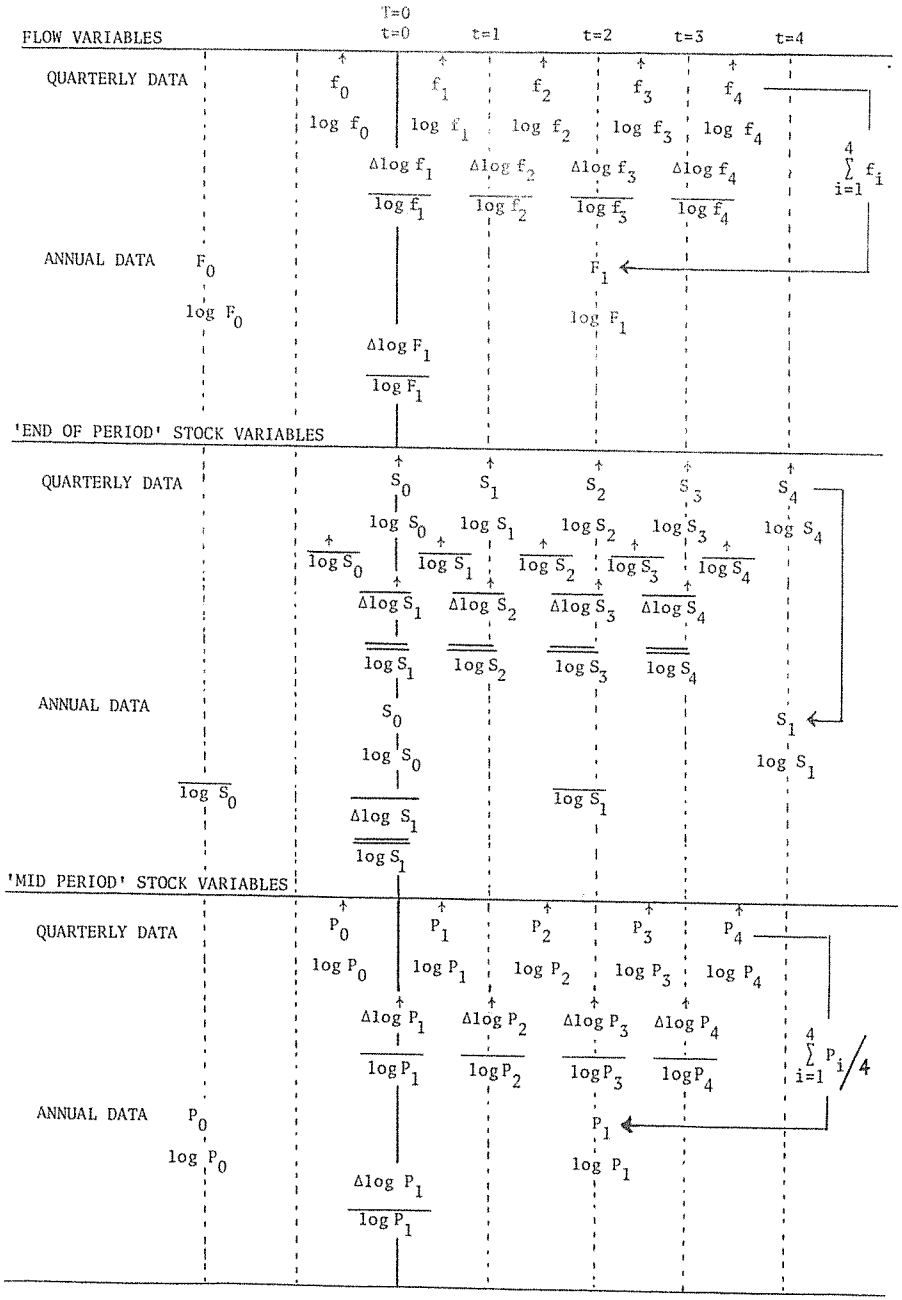
2.4 Depreciation

Depreciation measures are required to calculate private capital stock (K) , public capital stock (K_g) and real net domestic product (y) . Jonson et al. [10] use taxation depreciation allowance data. These data, however, relate only to plant and equipment, since 'other building and construction' expenditure is not tax-deductible. Further, the basis of these

51.

APPENDIX III TIMING DIAGRAM FOR MACRO DATA

Note : —— and ═══ denote single and double FORMA respectively.



	TRES	FRES	MRES	VRES	QZ
71.1	0.6327	-0.0215	-0.1595	-0.1393	0.0
71.2	0.6329	-0.0114	-0.1594	-0.1475	0.0
71.3	0.6322	-0.0252	-0.1493	-0.1426	0.0
71.4	0.6317	-0.0392	-0.1534	-0.1411	1.0
72.1	0.6319	-0.0523	-0.1544	-0.1485	1.0
72.2	0.6319	-0.0753	-0.1479	-0.1464	1.0
72.3	0.6312	-0.1145	-0.1461	-0.1461	1.0
72.4	0.6322	-0.1497	-0.1426	-0.1592	1.0
73.1	0.6334	-0.0727	-0.1426	-0.1642	1.0
73.2	0.6334	0.0010	-0.1456	-0.1573	1.0
73.3	0.6329	-0.0232	-0.1499	-0.1714	1.0
73.4	0.6327	-0.0303	-0.1540	-0.1741	1.0
74.1	0.6324	-0.0079	-0.1529	-0.1514	1.0
74.2	0.6319	0.0076	-0.1526	-0.1548	1.0
74.3	0.6325	0.0058	-0.1506	-0.1572	1.0
74.4	0.6327	-0.0169	-0.1475	-0.1528	1.0
75.1	0.6331	-0.0183	-0.1386	-0.1576	1.0
75.2	0.6331	0.0105	-0.1381	-0.1529	1.0
75.3	0.6334	0.0332	-0.1426	-0.1453	1.0
75.4	0.6347	0.1066	-0.1373	-0.1471	1.0
76.1	0.6366	0.0741	-0.1319	-0.1505	1.0
76.2	0.6370	0.0206	-0.1393	-0.1483	1.0
76.3	0.6373	0.0671	-0.1557	-0.1538	1.0
76.4	0.6377	0.0353	-0.1580	-0.1558	1.0

allowances is an historic cost valuation of the capital stock, which is inappropriate in times of inflation. Depreciation data for plant and equipment, 'other building and construction' and public stocks are derived in MACRO by assuming a constant proportional rate of decay of the preceding quarters' capital stock. The rates of decay for plant and equipment (0.04) and 'other building and construction' (0.015) are derived from Higgins, Johnston and Coghlan ([8], Appendix 2), while the public capital stock depreciation rate (0.018) is a weighted average of the two private depreciation rates, using as weights the 1958-59 to 1968-69 average proportion of public capital plant and equipment stocks to total public stocks.

2.5 Labour Market

Employment (L) data relate to wage and salary earners in non-farm employment plus total farm employment, and as such exclude non-farm self-employed, employers and unpaid helpers. Labour Force Survey employment data which includes these categories are only available from the March quarter 1964. The exclusion of these categories of employment will bias upward the unemployment rate (UR)[1] which is measured in terms of total registered unemployed; it will also result in misleading movements in the unemployment rate if those movements are due to persons who were formerly employers or self-employed registering for employment since there is no corresponding change in the number of wage and salary earners. Non-farm wages, salaries and supplements and the number of non-farm wage and salary earners are used to derive a series for average weekly earnings (W).

2.6 Dummy Variables

QE

QE is a dummy variable constructed to reflect expectations of exchange rate changes. The exchange rate variable (E) is the value of the

1. Jonson et al.[10] model the labour force (supply), measured as employment plus unemployment, rather than the unemployment rate.

Australian dollar relative to the U.S. dollar, and was fixed up until the end of 1971. QE takes on non-zero values after 1971.4. It is based on the work of Black [7], with declining geometric weights prior to an exchange rate change, and is related to the series used by Jonson et. al. [10]. QE takes on positive values when a devaluation is expected and negative values when a revaluation is expected. Further discussion of its construction may be found in Perazzelli and Spasojevic [11].

QUS

QUS takes on a value of - 1.0 in 1973.1 to allow for the $US devaluation in that quarter.

QER

The dummy variable, QER, takes on non-zero values in those quarters corresponding to major exchange rate changes other than the 1973.1 $US devaluation. The value of - 1.0 coincides with a revaluation, and + 1.0 a devaluation. QER enters the exchange rate equation, which is a reaction function, and its purpose is to allow for the step-function nature of the exchange rate variable.

QF

QF is a dummy variable appearing in the capital inflow equation and is designed to allow for restrictions imposed from time to time in the form of deposit requirements (VDR's) with the Reserve Bank. These deposits are for the length of the loan and attract no interest. A VDR of 25% was introduced on 25 September, 1972. This was varied to 33 1/3% on 15 July, 1973, 25% on 25 June, 1974, 5% on 8 July, 1974, and suspended on 11 November, 1974.[1] A

1. The VDR scheme was reintroduced at 25%, with exemptions for mining and manufacturing projects considered to be in the "national interest," on 17 January, 1977, and relaxed to exempt indirect investments at the end of April, 1977.

	TRES	FRES	MRES	VRES	QZ
58.3					0.0
58.4	0.6259	-0.0086	-0.1402	-0.1573	0.0
59.1	0.6293	-0.0490	-0.1407	-0.1348	0.0
59.2	0.6315	-0.0507	-0.1370	-0.1275	0.0
59.3	0.6309	-0.0402	-0.1348	-0.1453	0.0
59.4	0.6311	-0.0368	-0.1452	-0.1579	0.0
60.1	0.6331	-0.0374	-0.1504	-0.1648	0.0
60.2	0.6337	-0.0294	-0.1406	-0.1540	0.0
60.3	0.6349	-0.0306	-0.1370	-0.1536	0.0
60.4	0.6343	-0.0446	-0.1405	-0.1653	0.0
61.1	0.6331	-0.0370	-0.1545	-0.1572	0.0
61.2	0.6331	-0.0055	-0.1527	-0.1434	0.0
61.3	0.6341	-0.0223	-0.1357	-0.1347	0.0
61.4	0.6342	-0.0659	-0.1381	-0.1342	0.0
62.1	0.6337	-0.0692	-0.1378	-0.1376	0.0
62.2	0.6338	-0.0542	-0.1383	-0.1465	0.0
62.3	0.6340	-0.0355	-0.1442	-0.1497	0.0
62.4	0.6338	-0.0310	-0.1473	-0.1449	0.0
63.1	0.6342	-0.0402	-0.1433	-0.1356	0.0
63.2	0.6349	-0.0384	-0.1458	-0.1423	0.0
63.3	0.6361	-0.0401	-0.1453	-0.1544	0.0
63.4	0.6377	-0.0537	-0.1442	-0.1568	0.0
64.1	0.6371	-0.0564	-0.1468	-0.1494	0.0
64.2	0.6357	-0.0469	-0.1438	-0.1341	0.0
64.3	0.6349	-0.0363	-0.1438	-0.1425	0.0
64.4	0.6347	-0.0291	-0.1404	-0.1492	0.0
65.1	0.6345	-0.0252	-0.1431	-0.1466	0.0
65.2	0.6347	-0.0298	-0.1464	-0.1529	0.0
65.3	0.6337	-0.0371	-0.1464	-0.1536	0.0
65.4	0.6333	-0.0359	-0.1556	-0.1429	0.0
66.1	0.6335	-0.0333	-0.1589	-0.1383	0.0
66.2	0.6341	-0.0336	-0.1499	-0.1464	0.0
66.3	0.6339	-0.0370	-0.1450	-0.1412	0.0
66.4	0.6337	-0.0436	-0.1488	-0.1395	0.0
67.1	0.6332	-0.0472	-0.1458	-0.1442	0.0
67.2	0.6334	-0.0546	-0.1466	-0.1444	0.0
67.3	0.6336	-0.0511	-0.1484	-0.1394	0.0
67.4	0.6335	-0.0331	-0.1513	-0.1363	0.0
68.1	0.6335	-0.0292	-0.1573	-0.1372	0.0
68.2	0.6334	-0.0359	-0.1523	-0.1407	0.0
68.3	0.6333	-0.0295	-0.1563	-0.1472	0.0
68.4	0.6330	-0.0285	-0.1588	-0.1422	0.0
69.1	0.6326	-0.0277	-0.1480	-0.1388	0.0
69.2	0.6332	-0.0366	-0.1419	-0.1362	0.0
69.3	0.6328	-0.0683	-0.1395	-0.1367	0.0
69.4	0.6322	-0.0786	-0.1422	-0.1429	0.0
70.1	0.6318	-0.0629	-0.1515	-0.1427	0.0
70.2	0.6317	-0.0171	-0.1588	-0.1423	0.0
70.3	0.6316	-0.0134	-0.1569	-0.1364	0.0
70.4	0.6322	-0.0407	-0.1509	-0.1302	0.0

	P_W	r_W	P_I	QER	QA	QE
71.1	1.191	0.0571	1.180	0.0	0.0	0.0
71.2	1.207	0.0594	1.204	0.0	0.0	0.0
71.3	1.217	0.0556	1.212	0.0	0.0	0.0
71.4	1.229	0.0562	1.276	-1.0	0.0	0.0
72.1	1.246	0.0566	1.326	0.0	0.0	-0.0625
72.2	1.255	0.0559	1.320	0.0	0.0	-0.1250
72.3	1.265	0.0568	1.305	0.0	0.0	-0.2500
72.4	1.278	0.0562	1.357	-1.0	0.0	-0.5625
73.1	1.299	0.0620	1.447	0.0	0.0	-0.1250
73.2	1.322	0.0631	1.505	0.0	0.0	-0.2500
73.3	1.345	0.0642	1.601	-1.0	0.0	-0.5000
73.4	1.375	0.0636	1.661	0.0	0.0	0.0625
74.1	1.407	0.0678	1.757	0.0	0.0	0.1250
74.2	1.445	0.0703	1.977	0.0	0.0	0.2500
74.3	1.488	0.0731	1.912	1.0	0.0	0.5000
74.4	1.533	0.0678	2.035	0.0	0.0	0.0
75.1	1.571	0.0673	2.199	0.0	0.0	0.0625
75.2	1.587	0.0686	2.194	0.0	0.0	0.1250
75.3	1.616	0.0726	2.103	1.0	0.0	0.2500
75.4	1.644	0.0719	2.080	0.0	0.0	0.1250
76.1	1.656	0.0689	2.164	0.0	0.0	0.2500
76.2	1.677	0.0786	2.162	0.0	0.0	0.5000
76.3	1.694	0.0768	2.220	0.0	0.0	0.6000
76.4	1.719	0.0721	2.097	1.0	0.0	0.3000

substantial component of net capital inflow is overseas investment in Australian companies in the form of undistributed income which will not be subject to VDR's. QF is purely qualitative, with a value of unity from 1973.1 to 1974.3 and zero elsewhere.

QS

The bond rate equation includes the dummy variable, QS, to take account of the credit squeeze of 1960.4 (QS = 1.0), 1973.2 and 1973.3 (QS = 2.0).

QZ

QZ is a dummy variable with zero values up to 1971.3 when the exchange rate was fixed, and unit values thereafter. QZ is used in the construction of exchange rate expectations variables.

QA

From time to time the Reserve Bank has issued directives to the trading banks concerning the moderation of new lending (including unused overdraft limits) and the restriction of advances outstanding. Restrictions on advances outstanding were deemed necessary in November, 1960, and March, 1961 (effective about March, 1961, and June, 1961, respectively) when it was apparent that earlier directives to moderate new lending were being offset by the banks not calling in existing overdrafts and not cancelling unused overdraft limits as fast as usual. Thus, it is the restrictions on advances outstanding that have had the greatest impact on advances outstanding. The dummy variable, QA, is set to 1.0 in 1961.1 and 1961.2.[1]

1. In November, 1976, vague directives concerning advances outstanding were again issued.

3. THE IDENTITIES

3.1 Balance of Payments Residual (ΔF)

The balance of payments identity expresses changes in the level of official reserve assets (ΔR) as the difference between the balance of trade, and a residual defined to be net capital inflow. Thus, net invisibles and trade credit are incorporated into the capital inflow variable.

In addition, net undistributed income of overseas companies should be treated as a debit on current account to reflect income of overseas residents and a credit on capital account since the income is reinvested in Australia. Thus, net undistributed income is excluded from the residual, even though it is conceptually a capital inflow subject to much the same decision criteria as other capital inflows. Further, the level of official reserve assets used to derive the residual relates to reserves after adding in any allocation of SDR's and other transactions including IMF borrowings (see [2], Table 2).

The series used for the level of official reserve assets is net of valuation effects, that is, changes due to currency value movements. Thus, the series subtracts out the increased value in Australian dollars of our foreign currency reserves subsequent to a devaluation. Likewise, the balance of trade which is subtracted out to obtain the capital inflow measure is on a net basis. A capital inflow concept net of valuation effects would appear appropriate, given that domestic recipients would normally receive the Australian dollar equivalent of sums raised abroad immediately; it is then the Reserve Bank's newly acquired holdings of foreign exchange that are subject to subsequent currency variations.

The definitions of the balance of payments identity and data items appearing therein are the same as for the RBA76 Model, as reported by Jonson et al. [10].

	P_w	r_w	Pi	QER	QA	QE
58.3	0.868	0.0375	1.075	0.0	0.0	0.0
58.4	0.872	0.0380	1.072	0.0	0.0	0.0
59.1	0.874	0.0392	1.069	0.0	0.0	0.0
59.2	0.878	0.0409	1.081	0.0	0.0	0.0
59.3	0.859	0.0426	1.061	0.0	0.0	0.0
59.4	0.859	0.0427	1.093	0.0	0.0	0.0
60.1	0.862	0.0408	1.082	0.0	0.0	0.0
60.2	0.866	0.0398	1.076	0.0	0.0	0.0
60.3	0.868	0.0384	1.083	0.0	0.0	0.0
60.4	0.869	0.0388	1.083	0.0	0.0	0.0
61.1	0.869	0.0378	1.085	0.0	1.0	0.0
61.2	0.873	0.0388	1.096	0.0	1.0	0.0
61.3	0.876	0.0402	1.087	0.0	0.0	0.0
61.4	0.877	0.0406	1.082	0.0	0.0	0.0
62.1	0.885	0.0401	1.069	0.0	0.0	0.0
62.2	0.888	0.0390	1.070	0.0	0.0	0.0
62.3	0.890	0.0394	1.088	0.0	0.0	0.0
62.4	0.896	0.0387	1.092	0.0	0.0	0.0
63.1	0.899	0.0393	1.077	0.0	0.0	0.0
63.2	0.900	0.0400	1.088	0.0	0.0	0.0
63.3	0.903	0.0404	1.075	0.0	0.0	0.0
63.4	0.909	0.0414	1.077	0.0	0.0	0.0
64.1	0.912	0.0418	1.069	0.0	0.0	0.0
64.2	0.914	0.0413	1.080	0.0	0.0	0.0
64.3	0.920	0.0416	1.078	0.0	0.0	0.0
64.4	0.922	0.0414	1.084	0.0	0.0	0.0
65.1	0.929	0.0415	1.100	0.0	0.0	0.0
65.2	0.935	0.0414	1.102	0.0	0.0	0.0
65.3	0.941	0.0425	1.097	0.0	0.0	0.0
65.4	0.944	0.0443	1.103	0.0	0.0	0.0
66.1	0.954	0.0463	1.116	0.0	0.0	0.0
66.2	0.966	0.0463	1.119	0.0	0.0	0.0
66.3	0.971	0.0479	1.120	0.0	0.0	0.0
66.4	0.980	0.0465	1.120	0.0	0.0	0.0
67.1	0.987	0.0445	1.115	0.0	0.0	0.0
67.2	0.990	0.0486	1.121	0.0	0.0	0.0
67.3	0.999	0.0502	1.138	0.0	0.0	0.0
67.4	1.011	0.0536	1.144	0.0	0.0	0.0
68.1	1.024	0.0539	1.098	0.0	0.0	0.0
68.2	1.035	0.0523	1.110	0.0	0.0	0.0
68.3	1.045	0.0509	1.116	0.0	0.0	0.0
68.4	1.059	0.0565	1.120	0.0	0.0	0.0
69.1	1.072	0.0605	1.118	0.0	0.0	0.0
69.2	1.086	0.0606	1.129	0.0	0.0	0.0
69.3	1.102	0.0628	1.119	0.0	0.0	0.0
69.4	1.116	0.0686	1.129	0.0	0.0	0.0
70.1	1.132	0.0639	1.133	0.0	0.0	0.0
70.2	1.147	0.0699	1.151	0.0	0.0	0.0
70.3	1.156	0.0663	1.164	0.0	0.0	0.0
70.4	1.173	0.0597	1.162	0.0	0.0	0.0

	QS	t_1	t_2	sd	XM	QUS	t_3
71.1	0.0	0.1594	0.1107	-4.	-370.	0.0	0.0948
71.2	0.0	0.1616	0.1077	-23.	-70.	0.0	0.0868
71.3	0.0	0.1734	0.1097	-77.	-74.	0.0	0.0883
71.4	0.0	0.1726	0.1109	-26.	-252.	0.0	0.0876
72.1	0.0	0.1722	0.1117	30.	-169.	0.0	0.0935
72.2	0.0	0.1654	0.1122	-66.	-111.	0.0	0.0910
72.3	0.0	0.1664	0.1076	31.	-262.	0.0	0.0967
72.4	0.0	0.1566	0.1065	117.	-176.	0.0	0.0998
73.1	0.0	0.1573	0.1085	98.	140.	-1.0	0.0962
73.2	2.0	0.1510	0.1075	46.	93.	0.0	0.0938
73.3	2.0	0.1586	0.1037	359.	-300.	0.0	0.0807
73.4	0.0	0.1682	0.1110	118.	-151.	0.0	0.0791
74.1	0.0	0.1782	0.1127	65.	-57.	0.0	0.0797
74.2	0.0	0.1725	0.1124	224.	-2.	0.0	0.0775
74.3	0.0	0.2326	0.1112	110.	262.	0.0	0.0829
74.4	0.0	0.2090	0.1118	124.	153.	0.0	0.0824
75.1	0.0	0.1927	0.1073	133.	524.	0.0	0.0849
75.2	0.0	0.1773	0.1114	17.	-3.	0.0	0.0869
75.3	0.0	0.1957	0.1145	-8.	240.	0.0	0.0886
75.4	0.0	0.1887	0.1170	45.	126.	0.0	0.0877
76.1	0.0	0.2001	0.1232	37.	-73.	0.0	0.0894
76.2	0.0	0.1930	0.1201	7.	-378.	0.0	0.0909
76.3	0.0	0.1930	0.1199	123.	-637.	0.0	0.0896
76.4	0.0	0.1954	0.1131	28.	-466.	0.0	0.0918

3.2 Statistical Discrepancy (sd)

The change in inventories identity expresses the change in inventories as the difference between gross domestic product (measured by summing factor incomes) plus imports, on the one hand, and expenditure on gross domestic product plus exports plus a statistical discrepancy, on the other. The statistical discrepancy reflects measurement errors between the two sides of the National Accounts. Since the statistical discrepancy is no longer considered to be a random variable with zero mean and low standard deviation, it seems preferable not to include it as a component of the model variable "increase in stocks" (Dv), as done by Jonson et al. [10].

3.3 Money Supply Residual (XM)

The money supply identity equates the change in the money supply (ΔM)[1] to the change in foreign reserves plus that part of (a broad measure of) the government deficit not financed by bonds sold to the private non-monetary sector plus advances to the private non-monetary sector plus a residual, XM. The nature and components of the residual may be determined from a substitution of monetary sector balance sheet items, a 'government financing' identity and a 'monetary base' identity (see Johnston and Zarb [9], pp. 3-5).

Thus ,

$$\Delta M = \Delta C_{PNMS} + \Delta D_M \quad , \tag{3.1}$$

where

---

1. Defined as the change in deposits with the monetary sector (Australian trading and savings banks plus permanent building societies) by the private non-monetary sector (the personal sector plus the enterprise sector, including the short-term money market), plus the change in the private non-monetary sector's currency holdings.

ΔM = change in money supply ;

ΔC_{PNMS} = change in private non-monetary sector currency holdings ; and

ΔD_M = change in private non-monetary sector deposits with the monetary sector .

Given the equality of aggregate assets and liabilities of the monetary sector, ΔD_M may be substituted out in terms of the change in advances of the monetary sector, and the change in residual assets and liabilities of the monetary sector:[1]

$$\Delta M = \Delta C_{PNMS} + \Delta A_{MS} + \Delta ARES_{MS} - \Delta LRES_{MS} , \tag{3.2}$$

where

ΔA_{MS} = change in advances of the monetary sector ;

$\Delta LRES_{MS}$, $\Delta ARES_{MS}$ = changes in residual liabilities and assets of the monetary sector, defined as follows.

$$\Delta LRES_{MS} = \Delta R_{MS} + \Delta SF_{MS} + \Delta RB_{MS} + \Delta DTB_{ASL} + \Delta ML_{MS} , \tag{3.3}$$

where

ΔR_{MS} = change in reserves of the monetary sector ;

ΔSF_{MS} = change in shareholders' funds of the monetary sector ;

ΔARB_{MS} = change in Reserve Bank advances to the monetary sector ;

ΔDTB_{ASL} = change in Australian, state and local government deposits with the trading banks ;

ΔML_{MS} = change in miscellaneous liabilities of the monetary sector ; and

1. See [14],"Table 3.2 - Trading Banks' Aggregate Balance Sheet" and "Table 3.3 - Savings Banks' Aggregate Balance Sheet," for a detailed banking sector balance sheet.

	QS	t_1	t_2	sd	XM	QUS	t_3
58.3	0.0	0.1310	0.1215	-52.	40.	0.0	0.0761
58.4	0.0	0.1185	0.1219	23.	-28.	0.0	0.0723
59.1	0.0	0.1106	0.1155	-84.	-47.	0.0	0.0790
59.2	0.0	0.1166	0.1158	-44.	43.	0.0	0.0749
59.3	0.0	0.1096	0.1159	34.	-30.	0.0	0.0706
59.4	0.0	0.1168	0.1178	57.	-106.	0.0	0.0687
60.1	0.0	0.1177	0.1162	92.	-91.	0.0	0.0763
60.2	0.0	0.1156	0.1180	-62.	80.	0.0	0.0801
60.3	0.0	0.1189	0.1214	73.	-52.	0.0	0.0797
60.4	1.0	0.1251	0.1215	37.	-19.	0.0	0.0826
61.1	0.0	0.1239	0.1189	3.	-313.	0.0	0.0772
61.2	0.0	0.1433	0.1118	-47.	34.	0.0	0.0691
61.3	0.0	0.1586	0.1071	-30.	-32.	0.0	0.0739
61.4	0.0	0.1463	0.1099	-33.	-38.	0.0	0.0763
62.1	0.0	0.1380	0.1125	-21.	-7.	0.0	0.0784
62.2	0.0	0.1219	0.1116	17.	-9.	0.0	0.0810
62.3	0.0	0.1088	0.1114	-6.	-63.	0.0	0.0810
62.4	0.0	0.1160	0.1103	-33.	-60.	0.0	0.0802
63.1	0.0	0.1245	0.1099	-96.	2.	0.0	0.0776
63.2	0.0	0.1174	0.1120	22.	-126.	0.0	0.0831
63.3	0.0	0.1147	0.1066	23.	-3.	0.0	0.0800
63.4	0.0	0.1199	0.1040	51.	-138.	0.0	0.0820
64.1	0.0	0.1240	0.1038	-57.	-66.	0.0	0.0821
64.2	0.0	0.1252	0.1049	-111.	-45.	0.0	0.0813
64.3	0.0	0.1238	0.1063	29.	-39.	0.0	0.0800
64.4	0.0	0.1458	0.1085	-37.	43.	0.0	0.0757
65.1	0.0	0.1386	0.1071	1.	-89.	0.0	0.0756
65.2	0.0	0.1382	0.1079	29.	-15.	0.0	0.0775
65.3	0.0	0.1583	0.1096	19.	-109.	0.0	0.0742
65.4	0.0	0.1193	0.1112	-96.	-218.	0.0	0.0748
66.1	0.0	0.1389	0.1081	-42.	-174.	0.0	0.0760
66.2	0.0	0.1501	0.1116	-4.	-43.	0.0	0.0741
66.3	0.0	0.1363	0.1077	-101.	-60.	0.0	0.0741
66.4	0.0	0.1256	0.1079	-27.	-112.	0.0	0.0742
67.1	0.0	0.1451	0.1112	-43.	7.	0.0	0.0752
67.2	0.0	0.1400	0.1096	-23.	-176.	0.0	0.0749
67.3	0.0	0.1439	0.1099	-100.	-34.	0.0	0.0779
67.4	0.0	0.1320	0.1085	-58.	-201.	0.0	0.0744
68.1	0.0	0.1500	0.1123	-87.	-192.	0.0	0.0766
68.2	0.0	0.1471	0.1110	-8.	-101.	0.0	0.0723
68.3	0.0	0.1354	0.1109	-5.	-291.	0.0	0.0799
68.4	0.0	0.1380	0.1131	-74.	-158.	0.0	0.0815
69.1	0.0	0.1524	0.1100	-54.	21.	0.0	0.0791
69.2	0.0	0.1452	0.1113	-113.	-13.	0.0	0.0823
69.3	0.0	0.1521	0.1122	-42.	23.	0.0	0.0849
69.4	0.0	0.1458	0.1109	-27.	-121.	0.0	0.0858
70.1	0.0	0.1546	0.1068	-45.	-217.	0.0	0.0864
70.2	0.0	0.1602	0.1103	-34.	-175.	0.0	0.0892
70.3	0.0	0.1755	0.1107	-138.	-118.	0.0	0.0896
70.4	0.0	0.1507	0.1100	-131.	-80.	0.0	0.0919

	K	g	K_g	W_A	c	t	QF
71.1	20943.	808.	24653.	1.129	410.	49.	0.0
71.2	21258.	799.	24809.	1.116	405.	50.	0.0
71.3	21588.	808.	25032.	1.130	409.	51.	0.0
71.4	21868.	812.	25243.	1.146	438.	52.	0.0
72.1	22082.	838.	25430.	1.136	433.	53.	0.0
72.2	22301.	813.	25598.	1.141	441.	54.	0.0
72.3	22495.	817.	25803.	1.150	447.	55.	0.0
72.4	22670.	832.	25966.	1.156	481.	56.	0.0
73.1	22855.	872.	26111.	1.143	518.	57.	1.0
73.2	23058.	911.	26261.	1.153	520.	58.	1.0
73.3	23278.	927.	26416.	1.164	512.	59.	1.0
73.4	23577.	921.	26558.	1.164	535.	60.	1.0
74.1	23861.	939.	26746.	1.167	542.	61.	1.0
74.2	24085.	888.	26925.	1.243	555.	62.	1.0
74.3	24306.	947.	27104.	1.290	581.	63.	1.0
74.4	24474.	966.	27352.	1.332	605.	64.	0.0
75.1	24636.	980.	27613.	1.316	634.	65.	0.0
75.2	24822.	1012.	27908.	1.338	693.	66.	0.0
75.3	24987.	1034.	28176.	1.317	758.	67.	0.0
75.4	25100.	1051.	28421.	1.302	767.	68.	0.0
76.1	25235.	1063.	28578.	1.311	757.	69.	0.0
76.2	25388.	1077.	28799.	1.329	764.	70.	0.0
76.3	25483.	1079.	28964.	1.340	856.	71.	0.0
76.4	25642.	1133.	29132.	1.338	829.	72.	0.0

(3.4) $$\Delta ARES_{MS} = \Delta AGS_{MS} + \Delta LGS_{MS} + \Delta OS_{MS} + \Delta DRB_{MS} + \Delta C_{MS} + \Delta FA_{MS} + \Delta MA_{MS} ,$$

where

ΔAGS_{MS} = change in Australian government securities holdings of the monetary sector ;

ΔLGS_{MS} = change in local and semi government securities holdings of the monetary sector ;

ΔOS_{MS} = change in other securities holdings of the monetary sector ;

ΔDRB_{MS} = change in deposits of the monetary sector with Reserve Bank (including SRD's) ;

ΔC_{MS} = change in currency holdings of the monetary sector ;

ΔFA_{MS} = change in fixed assets of the monetary sector ; and

ΔMA_{MS} = change in miscellaneous assets of the monetary sector .

Changes in currency holdings of the private sector consist of notes, which are a liability of the Reserve Bank, and coin, which are a liability of the Australian government. The 'monetary base' identity, which defines the change in private sector currency holdings, is basically the Reserve Bank flow of funds account.[1] It defines the transactions available to the Reserve Bank to increase its liabilities in the form of the note issue, with net new coin issue to the private sector added to both left and right hand sides, and the change in government note holdings taken across to the right hand side :

(3.5) $$\Delta C_{PNMS} + \Delta C_{MS} = \Delta R - (\Delta DRB_{MS} + \Delta DRB_G) + \Delta AGS_{RB} + (\Delta ARB_G + \Delta ARB_{PNMS} + \Delta ARB_{MS}) - \Delta C_G + CC - XB ,$$

1. See [14], "Table 3.1 - Reserve Bank of Australia Aggregate Balance Sheet" for a detailed Reserve Bank balance sheet.

where

ΔR = change in level of official reserve assets, net of valutation effects ;

ΔDRB_G = change in deposits of the government with the Reserve Bank ;

ΔAGS_{RB} = change in Australian government security holdings of the Reserve Bank ;

ΔARB_G = change in Reserve Bank advances to the Australian government ;

ΔARB_{PNMS} = change in Reserve Bank advances to the private non-monetary sector ;

ΔC_G = change in government currency holdings ;

CC = net new coin issue ; and

XB = monetary base balancing item .

Thus, the private sector's holdings of currency will, ceteris paribus, increase as a result of :

(i) an increase in the level of offical reserve assets, net of valuation effects (exchange rate variations do not affect the amount of currency circulating domestically) ;

(ii) a fall in the level of deposits with the Reserve Bank ;

(iii) an increase in Reserve Bank advances, or Australian government security holdings ;

(iv) a reduction in government currency holdings ; or

(v) new coinage issue .

XB will include changes in

(i) enterprise deposits with the Reserve Bank ;

(ii) non-official domestic holdings of gold and foreign exchange ; and

(iii) VDR deposits with the Reserve Bank.

As an example, if government deposits with the Reserve Bank are reduced, and some of the proceeds are maintained as government cash holdings, then the impact effect on private sector currency holdings will be an increase of $(-\Delta DRB_G - \Delta C_G)$.

	K	g	K_g	W_A	c	t	QF
58.3	11570.	417.	19284.	0.918	200.	-1.	0.0
58.4	11610.	398.	19277.	0.915	197.	0.	0.0
59.1	11669.	399.	19283.	0.914	206.	1.	0.0
59.2	11727.	420.	19314.	0.909	214.	2.	0.0
59.3	11770.	429.	19332.	0.933	212.	3.	0.0
59.4	11842.	424.	19341.	0.934	229.	4.	0.0
60.1	11951.	422.	19349.	0.958	222.	5.	0.0
60.2	12078.	433.	19388.	0.955	229.	6.	0.0
60.3	12220.	409.	19395.	0.942	221.	7.	0.0
60.4	12351.	445.	19419.	0.943	233.	8.	0.0
61.1	12452.	450.	19446.	0.955	238.	9.	0.0
61.2	12546.	453.	19475.	0.966	248.	10.	0.0
61.3	12645.	458.	19547.	0.965	261.	11.	0.0
61.4	12726.	459.	19594.	0.970	255.	12.	0.0
62.1	12832.	470.	19647.	0.973	274.	13.	0.0
62.2	12941.	474.	19685.	0.969	268.	14.	0.0
62.3	13062.	475.	19730.	0.969	275.	15.	0.0
62.4	13191.	491.	19772.	0.969	275.	16.	0.0
63.1	13364.	490.	19817.	0.952	277.	17.	0.0
63.2	13491.	500.	19898.	0.956	270.	18.	0.0
63.3	13641.	494.	19958.	0.958	279.	19.	0.0
63.4	13806.	493.	20043.	0.959	285.	20.	0.0
64.1	13969.	515.	20123.	0.939	280.	21.	0.0
64.2	14188.	540.	20237.	0.950	293.	22.	0.0
64.3	14395.	531.	20355.	0.973	297.	23.	0.0
64.4	14617.	557.	20482.	0.974	295.	24.	0.0
65.1	14816.	573.	20628.	0.978	303.	25.	0.0
65.2	15090.	573.	20760.	0.980	298.	26.	0.0
65.3	15353.	632.	20912.	0.978	302.	27.	0.0
65.4	15616.	637.	21080.	0.976	312.	28.	0.0
66.1	15872.	623.	21248.	0.973	306.	29.	0.0
66.2	16080.	632.	21392.	0.967	310.	30.	0.0
66.3	16329.	662.	21558.	0.996	312.	31.	0.0
66.4	16551.	664.	21708.	1.002	318.	32.	0.0
67.1	16776.	688.	21860.	1.004	320.	33.	0.0
67.2	16975.	694.	22009.	1.005	328.	34.	0.0
67.3	17195.	699.	22182.	1.020	326.	35.	0.0
67.4	17427.	709.	22336.	1.018	329.	36.	0.0
68.1	17665.	779.	22490.	1.024	331.	37.	0.0
68.2	17902.	732.	22602.	1.024	334.	38.	0.0
68.3	18147.	749.	22857.	1.038	337.	39.	0.0
68.4	18426.	753.	23029.	1.063	345.	40.	0.0
69.1	18677.	748.	23203.	1.064	357.	41.	0.0
69.2	18972.	781.	23379.	1.063	351.	42.	0.0
69.3	19229.	748.	23547.	1.060	363.	43.	0.0
69.4	19482.	803.	23751.	1.058	376.	44.	0.0
70.1	19746.	760.	23907.	1.072	373.	45.	0.0
70.2	20014.	786.	24109.	1.071	383.	46.	0.0
70.3	20291.	809.	24294.	1.072	384.	47.	0.0
70.4	20588.	812.	24479.	1.073	405.	48.	0.0

	T_1	T_2	R	M	V	r	E
71.1	1147.	923.	1767.	16909.	7844.	0.0684	0.893
71.2	1177.	934.	2117.	17440.	7829.	0.0683	0.893
71.3	1315.	991.	2423.	17931.	7874.	0.0678	0.893
71.4	1328.	998.	2760.	18348.	7909.	0.0615	0.840
72.1	1343.	1031.	3107.	18896.	7801.	0.0584	0.840
72.2	1341.	1071.	3558.	19739.	7745.	0.0585	0.840
72.3	1395.	1063.	4295.	21015.	7597.	0.0532	0.840
72.4	1365.	1100.	5072.	22487.	7445.	0.0530	0.784
73.1	1446.	1179.	4703.	23666.	7442.	0.0538	0.706
73.2	1449.	1211.	4615.	25169.	7576.	0.0640	0.706
73.3	1646.	1244.	4725.	26543.	7541.	0.0805	0.672
73.4	1796.	1394.	4818.	27364.	7765.	0.0805	0.672
74.1	1951.	1461.	4621.	28240.	8197.	0.0837	0.672
74.2	1967.	1521.	4240.	28902.	8558.	0.0952	0.672
74.3	2793.	1626.	3775.	28585.	8950.	0.0950	0.763
74.4	2645.	1710.	3681.	29889.	9279.	0.0950	0.754
75.1	2486.	1715.	3698.	31844.	9134.	0.0950	0.739
75.2	2422.	1860.	3789.	33437.	9123.	0.0950	0.754
75.3	2715.	1987.	3636.	35352.	8974.	0.1000	0.796
75.4	2740.	2108.	2933.	36636.	8841.	0.1000	0.796
76.1	3060.	2286.	2883.	37237.	8951.	0.0999	0.801
76.2	3095.	2381.	2759.	38321.	9001.	0.0999	0.809
76.3	3235.	2436.	2899.	40034.	9066.	0.0999	0.808
76.4	3291.	2362.	2927.	41439.	9031.	0.1041	0.921

The 'government financing' identity defines the various sources of finance to fund the Australian government budget deficit:[1]

$$BD_G = (\Delta AGS_{MS} + \Delta AGS_{RB} + \Delta AGS_{PNMS}) - \Delta DRB_G - \Delta DTB_G + \Delta ARB_G + CC - \Delta C_G + OFCI + XG \quad , \tag{3.6}$$

where

BD_G = Australian government budget deficit ;

ΔAGS_{PNMS} = change in Australian government securities holdings of the private non-monetary sector ;

ΔDTB_G = change in deposits of the Australian government with the trading banks ;

$OFCI$ = official net foreign capital inflow ; and

XG = government financing balancing item .

Thus, the budget deficit may be financed by

(i) the selling of more Australian government securities ;

(ii) a reduction in government deposits with the Reserve Bank or trading banks, or an increase in Reserve Bank advances to the Australian government ;

(iii) new coin issue ;

(iv) a reduction in government currency holdings ; or

(v) government borrowing overseas.

Some of the items included in XG are changes in

(i) Australian government holdings of local and semi-government securities and debentures, notes, securities and equities in enterprises ;

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1. See the table entitled "Financial Transactions of the Australian Government" in [13] for details (under a slightly different grouping) of Australian government financing transactions.

(ii) Australian government debt in the form of trade credit and commercial bank advances ; and

(iii) changes in state and local government holdings of Australian government securities .

We may substitute (3.6) into (3.5) to obtain an expression for currency holdings in terms of the Australian government budget deficit :

$$(3.7) \qquad \Delta C_{PNMS} + \Delta C_{MS} = \Delta R + BD_G - \Delta AGS_{MS} - \Delta AGS_{PNMS} - \Delta DRB_{MS} + \Delta DTB_G + \Delta ARB_{MS} + \Delta ARB_{PNMS} - OFCI - XB - XG .$$

Substituting (3.3), (3.4) and (3.7) into (3.2), changes in the volume of money may be identified as being equal to :

$$(3.8) \qquad \Delta M = (\Delta R - OFCI) + (BD_G - \Delta AGS_{PNMS}) + \Delta A_{MS} + \Delta ARB_{PNMS} + \Delta LGS_{MS} + \Delta OS_{MS} - (\Delta DTB_{ASL} - \Delta DTB_G) + \Delta FA_{MS} - \Delta R_{MS} - \Delta SF_{MS} - XB - XG + \Delta MA_{MS} - \Delta ML_{MS} .$$

Therefore, the size of the increase in the money supply will be determined by

(i) changes in foreign reserves net of official net foreign capital inflow ;

(ii) the size of that part of the Australian government deficit not financed by bonds sold to the private non-monetary sector ;

(iii) changes in the level of advances of the monetary sector ;

(iv) changes in advances of the Reserve Bank to the private non-monetary sector ;

(v) changes in local and semi-government and other securities held by the monetary sector ;

	T_1	T_2	R	M	v	r	E
58.3	327.	343.	903.	6563.	4077.	0.0520	0.893
58.4	305.	354.	901.	6614.	4164.	0.0517	0.893
59.1	282.	341.	899.	6717.	4230.	0.0503	0.893
59.2	309.	357.	909.	6846.	4273.	0.0504	0.893
59.3	298.	364.	979.	7038.	4305.	0.0502	0.893
59.4	326.	385.	1045.	7138.	4284.	0.0502	0.893
60.1	337.	388.	1059.	7231.	4268.	0.0508	0.893
60.2	341.	401.	992.	7379.	4457.	0.0508	0.893
60.3	368.	419.	868.	7427.	4670.	0.0511	0.893
60.4	384.	425.	782.	7404.	4852.	0.0555	0.893
61.1	372.	412.	787.	7401.	5010.	0.0564	0.893
61.2	423.	391.	993.	7510.	4995.	0.0550	0.893
61.3	475.	387.	1078.	7626.	4871.	0.0549	0.893
61.4	443.	395.	1122.	7765.	4777.	0.0507	0.893
62.1	435.	416.	1083.	7933.	4754.	0.0505	0.893
62.2	394.	419.	1107.	8070.	4766.	0.0500	0.893
62.3	356.	419.	1136.	8228.	4869.	0.0499	0.893
62.4	387.	426.	1162.	8385.	4981.	0.0449	0.893
63.1	425.	446.	1194.	8567.	5051.	0.0484	0.893
63.2	406.	454.	1237.	8769.	5083.	0.0455	0.893
63.3	417.	458.	1349.	8980.	5077.	0.0448	0.893
63.4	450.	462.	1538.	9272.	5054.	0.0446	0.893
64.1	466.	471.	1658.	9559.	5110.	0.0449	0.893
64.2	485.	489.	1687.	9846.	5235.	0.0476	0.893
64.3	496.	503.	1701.	10143.	5323.	0.0492	0.893
64.4	603.	526.	1626.	10353.	5531.	0.0495	0.893
65.1	578.	525.	1520.	10541.	5666.	0.0532	0.893
65.2	592.	540.	1397.	10673.	5807.	0.0536	0.893
65.3	679.	568.	1348.	10754.	5849.	0.0536	0.893
65.4	511.	576.	1346.	10912.	5967.	0.0536	0.893
66.1	601.	567.	1352.	11094.	5959.	0.0536	0.893
66.2	661.	591.	1433.	11317.	5925.	0.0538	0.893
66.3	628.	596.	1410.	11581.	5990.	0.0538	0.893
66.4	588.	596.	1352.	11804.	6063.	0.0522	0.893
67.1	703.	636.	1289.	12032.	6202.	0.0522	0.893
67.2	688.	640.	1215.	12290.	6267.	0.0523	0.893
67.3	704.	650.	1205.	12596.	6296.	0.0521	0.893
67.4	661.	657.	1284.	12924.	6264.	0.0530	0.893
68.1	775.	701.	1283.	13098.	6394.	0.0530	0.893
68.2	777.	704.	1279.	13400.	6414.	0.0531	0.893
68.3	744.	709.	1326.	13676.	6594.	0.0532	0.893
68.4	789.	757.	1366.	13944.	6772.	0.0526	0.893
69.1	891.	748.	1462.	14381.	6938.	0.0532	0.893
69.2	870.	785.	1413.	14790.	7110.	0.0573	0.893
69.3	934.	813.	1277.	15108.	7234.	0.0581	0.893
69.4	921.	832.	1205.	15497.	7302.	0.0595	0.893
70.1	992.	818.	1199.	15850.	7353.	0.0605	0.893
70.2	1066.	861.	1456.	15950.	7490.	0.0686	0.893
70.3	1180.	883.	1464.	16175.	7639.	0.0687	0.893
70.4	1032.	899.	1523.	16552.	7734.	0.0681	0.893

	P_x	W	UR	L	B	F	A
71.1	0.963	1.3940	0.0105	4954.2	4498.	6181.	8701.2
71.2	0.987	1.4213	0.0118	4964.3	4779.	6495.	9034.5
71.3	1.020	1.4541	0.0128	4928.5	4935.	6764.	9302.2
71.4	0.986	1.4860	0.0143	4943.6	5126.	7112.	9634.1
72.1	1.030	1.5116	0.0157	4964.6	5245.	7337.	9913.8
72.2	1.059	1.5590	0.0176	4973.3	5444.	7522.	10438.9
72.3	1.110	1.5920	0.0192	4994.7	5319.	7929.	10855.7
72.4	1.203	1.6165	0.0176	5004.9	5504.	8217.	11599.2
73.1	1.289	1.6558	0.0148	5032.9	5318.	7337.	12526.2
73.2	1.260	1.7660	0.0147	5059.7	5261.	6964.	13496.2
73.3	1.330	1.8450	0.0140	5116.7	5212.	6794.	14631.1
73.4	1.385	1.9091	0.0129	5171.2	5262.	6679.	15351.6
74.1	1.456	1.9575	0.0135	5216.6	5168.	6545.	16164.6
74.2	1.517	2.1342	0.0139	5251.7	5212.	6495.	16936.9
74.3	1.607	2.3578	0.0194	5249.0	5308.	6329.	17114.1
74.4	1.734	2.4857	0.0317	5216.7	5344.	6403.	18111.5
75.1	1.732	2.5629	0.0432	5175.3	5349.	6255.	18747.7
75.2	1.719	2.6452	0.0446	5192.0	5628.	6065.	19479.6
75.3	1.777	2.7082	0.0453	5200.9	5590.	5723.	20269.1
75.4	1.779	2.8370	0.0471	5193.8	5779.	4896.	21158.6
76.1	1.806	2.9095	0.0453	5191.2	6706.	4865.	22151.6
76.2	1.921	3.0454	0.0455	5185.3	7157.	4613.	23218.0
76.3	1.935	3.1523	0.0483	5185.6	7111.	4434.	24338.5
76.4	1.935	3.1743	0.0492	5177.5	7486.	4424.	25393.9

(vi) changes in state and local government deposits with the trading banks ;

(vii) changes in monetary sector fixed assets, reserves and shareholder's funds ; and

(viii) the size of the balancing items, XB , XG , ΔMA_{MS} and ΔML_{MS} .

Relationship (3.6) defines the sources of finance of the Australian government deficit, that deficit being the excess of Australian government expenditures, including all grants and advances to state, local and semi-governments, over receipts. If we now subsume the state, local and semi-government net financing transactions (netting out any sale of bonds, grants, advances and deposits between the Australian, state, local and semi-governments) into the items XG , (3.6) will relate to the total government deficit defined as the balance of total government expenditures and receipts.

Substituting these expenditure and receipt items[1] for the budget deficit in (3.8) gives the relationship appearing in the Model for changes in the money supply in terms of data items that are largely either exogenous to the Model or else explained elsewhere in the Model; changes in the money supply are consequently more closely related to the basic instruments of policy :

$$(3.9) \quad \Delta M = \Delta R + (P[\Delta K_g + DEP] + P_g g + Pc - T_1 - T_2 - \Delta B + \Delta A) + XM \ ,$$

1. See [1], 1975-76 Issue, Tables 41-45, for details of government expenditure and receipt items.

where

P = gross domestic product deflator ;

K_g = stock of real government capital (with the applicable depreciation rate being estimated at .018) ;

DEP = depreciation of stock of real government capital ;[1]

P_g = government final consumption expenditure deflator ;

g = real government final consumption expenditure ;

c = real cash benefits ;

T_1 = direct tax receipts ;

T_2 = indirect tax receipts ;

$\Delta B = \Delta AGS_{PNMS}$; and

$\Delta A = \Delta A_{MS}$.

XM is a residual term which includes -OFCI, ΔARB_{PNMS}, ΔLGS_{MS}, ΔOS_{MS}, ΔFA_{MS}, $-\Delta R_{MS}$, $-\Delta SF_{MS}$, ΔMA_{MS}, ΔML_{MS}, - XB and - XG (where XG has inter-governmental bodies' transactions netted out). XG will include bonds sold by local and semi-government (other than Australian government bonds). (The state and local government financing items, 'state and local government reduction in cash and bank balances' and 'other state and local government funds available [including errors and omissions]' will largely cancel with monetary sector balance sheet items.) Additionally, XM includes miscellaneous government outlays in the form of advances, grants for private capital purposes, transfers to overseas, subsidies paid, and increases in stocks; subtracted out from it are various government receipts - other taxes, fees and fines, net interest, rent and dividends, net receipts from government enterprise transactions (gross of depreciation allowances) and net proceeds from sale of assets. ΔK_g represents total government net investment in 1966-67 prices, so that $(\Delta K_g + DEP)$

1. A constant depreciation rate of 1.8% per quarter is assumed for the stock of real government capital. Thus DEP is replaced in the discrete specification by .018 K_{g-1} for estimation and simulation.

	P_x	W	UR	L	B	F	A
58.3	0.895	0.6671	0.0171	3573.2	2652.	2945.	2433.0
58.4	0.905	0.6797	0.0173	3586.8	2644.	2959.	2440.0
59.1	0.912	0.6757	0.0169	3601.4	2666.	2932.	2491.0
59.2	0.922	0.6860	0.0163	3613.5	2730.	2941.	2501.0
59.3	0.946	0.7096	0.0156	3637.0	2745.	3014.	2529.2
59.4	0.922	0.7159	0.0148	3650.9	2761.	3077.	2587.0
60.1	0.952	0.7315	0.0136	3682.2	2774.	3116.	2683.2
60.2	0.939	0.7516	0.0118	3718.7	2869.	3171.	2793.4
60.3	0.909	0.7647	0.0104	3760.0	2820.	3213.	2924.0
60.4	0.953	0.7658	0.0108	3779.3	2860.	3293.	2975.9
61.1	0.910	0.7629	0.0147	3784.1	2657.	3424.	2972.6
61.2	0.860	0.7632	0.0223	3751.0	2821.	3599.	2921.9
61.3	0.925	0.7804	0.0278	3735.2	2841.	3594.	2897.5
61.4	0.895	0.7842	0.0284	3737.8	2853.	3534.	2933.7
62.1	0.903	0.7928	0.0241	3765.7	2814.	3435.	2982.7
62.2	0.900	0.7962	0.0214	3798.1	2911.	3451.	3045.0
62.3	0.903	0.7937	0.0205	3830.1	2985.	3545.	3104.8
62.4	0.911	0.7998	0.0205	3844.0	3047.	3607.	3175.9
63.1	0.963	0.8074	0.0189	3869.4	3142.	3613.	3276.7
63.2	0.968	0.8168	0.0180	3900.5	3132.	3703.	3354.8
63.3	0.988	0.8245	0.0168	3936.9	3255.	3718.	3403.7
63.4	1.023	0.8491	0.0145	3967.4	3285.	3776.	3499.2
64.1	1.053	0.8344	0.0129	4004.5	3346.	3817.	3608.9
64.2	1.007	0.8520	0.0110	4039.6	3365.	3860.	3714.8
64.3	1.003	0.8799	0.0096	4079.1	3400.	3935.	3856.3
64.4	0.994	0.9018	0.0094	4113.5	3401.	3964.	3979.4
65.1	0.967	0.9114	0.0090	4151.9	3349.	3985.	4111.7
65.2	0.967	0.9176	0.0087	4195.7	3441.	4006.	4321.6
65.3	0.971	0.9344	0.0088	4229.0	3435.	4135.	4406.6
65.4	0.990	0.9299	0.0099	4252.0	3503.	4310.	4519.4
66.1	1.022	0.9509	0.0113	4273.9	3558.	4391.	4669.9
66.2	1.029	0.9441	0.0117	4309.0	3632.	4513.	4757.1
66.3	1.016	0.9859	0.0125	4318.9	3721.	4528.	4905.8
66.4	1.001	0.9883	0.0129	4344.3	3821.	4538.	5076.7
67.1	1.003	1.0040	0.0127	4378.3	3924.	4565.	5248.9
67.2	0.985	1.0214	0.0131	4408.3	3871.	4527.	5447.8
67.3	0.968	1.0399	0.0136	4429.3	3966.	4624.	5612.2
67.4	0.967	1.0479	0.0128	4460.7	4032.	4806.	5806.3
68.1	0.951	1.0602	0.0129	4495.1	4120.	5039.	5999.3
68.2	0.976	1.0765	0.0130	4520.5	4201.	5191.	6222.1
68.3	0.972	1.0897	0.0122	4558.9	4223.	5395.	6458.4
68.4	0.981	1.1240	0.0117	4593.7	4279.	5497.	6637.6
69.1	0.989	1.1588	0.0115	4621.4	4312.	5665.	6787.4
69.2	0.997	1.1631	0.0109	4656.4	4311.	5698.	7019.1
69.3	0.991	1.1887	0.0098	4720.0	4271.	5566.	7258.7
69.4	1.003	1.2077	0.0096	4763.1	4283.	5528.	7573.0
70.1	1.019	1.2401	0.0093	4804.9	4187.	5482.	7888.7
70.2	0.997	1.2617	0.0092	4854.4	4478.	5767.	8030.1
70.3	0.994	1.2865	0.0100	4885.3	4412.	5788.	8222.2
70.4	0.985	1.3168	0.0101	4924.4	4484.	5878.	8402.5

	d	k	x	i	y	p	p_g
71.1	4635.	0.0171	1265.	1212.	6134.	1.172	1.321
71.2	4663.	0.0149	1402.	1254.	6043.	1.205	1.375
71.3	4798.	0.0154	1357.	1245.	6238.	1.216	1.413
71.4	4810.	0.0129	1332.	1198.	6257.	1.230	1.435
72.1	4822.	0.0097	1386.	1172.	6197.	1.259	1.469
72.2	4927.	0.0099	1414.	1111.	6308.	1.285	1.499
72.3	4996.	0.0087	1388.	1104.	6380.	1.313	1.537
72.4	5102.	0.0077	1481.	1173.	6546.	1.332	1.563
73.1	5199.	0.0081	1469.	1284.	6680.	1.376	1.564
73.2	5268.	0.0088	1377.	1365.	6725.	1.427	1.652
73.3	5353.	0.0095	1403.	1437.	6945.	1.494	1.691
73.4	5444.	0.0128	1400.	1550.	6998.	1.526	1.781
74.1	5482.	0.0120	1328.	1689.	7029.	1.557	1.868
74.2	5471.	0.0093	1347.	1786.	6908.	1.651	2.024
74.3	5449.	0.0091	1434.	1902.	6831.	1.758	2.150
74.4	5442.	0.0069	1430.	1716.	6991.	1.810	2.290
75.1	5505.	0.0066	1462.	1443.	6913.	1.866	2.444
75.2	5589.	0.0075	1536.	1441.	7184.	1.902	2.479
75.3	5645.	0.0066	1440.	1454.	6941.	1.999	2.560
75.4	5652.	0.0045	1467.	1502.	6938.	2.093	2.692
76.1	5689.	0.0054	1519.	1600.	7110.	2.151	2.764
76.2	5796.	0.0060	1561.	1649.	7216.	2.222	2.892
76.3	5841.	0.0037	1699.	1653.	7415.	2.260	2.999
76.4	5928.	0.0062	1619.	1711.	7289.	2.311	2.919

is government gross fixed capital expenditure. This expenditure is expressed in current $m using the model aggregate price variable, P. Hence, XM will also include an error term, $(P_K - P)(\Delta K_g + DEP)$, where P_k is the deflator for government capital expenditure.[1]

Data availability for the components of XM will affect the accuracy of ex ante forecasts of XM. Annual data for the years 1964-65 through to 1974-75 for the principal components of XM are given in Table 1. It appears that XM can be explained to a fair degree of accuracy, although there remains a systematic residual.

In preparing forecasts of XM, timeliness of the component data will be of major concern. Quarterly data on items 1 - 4 and item 12 of Table 1 are obtainable from the Reserve Bank of Australia (RBA) Statistical Bulletin [12]. Items 5 - 11 are only available on an annual basis, obtained from the RBA Statistical Bulletin Financial Flow Accounts Supplement [14]. These data have a publication lag of some two years. Quarterly data are available for items 18 - 22 and item 25 from the Australian Bureau of Statistics (ABS) Quarterly Estimates of National Income and Expenditure [3]. Items 13 - 17 and 23 - 24 are available on an annual basis from the ABS Australian National Accounts, National Income and Expenditure [1].

3.4 Identity Residuals for Estimation and Simulation

The identities (particularly the balance of payments, money supply and inventory change identities) form major links connecting the different sectors of the model and as such have a significant effect on the model dynamics; thus, if the identities were allowed to be satisfied only approximately the dynamics could be considerably altered. Because the MACRO specification is

1. Jonson et al. assume a residual term, f(rB), designed to measure interest payments on government bonds, B. (r is the theoretical yield on ten year Commonwealth Government securities.) Other components of XM are omitted.

Table 1 : Principal Components of XM ($m)

	Title	Mnemonic	1964-65	1965-66	1966-67	1967-68	1968-69	1969-70	1970-71	1971-72	1972-73	1973-74	1974-75
1*	Official foreign net capital inflow	OFCI	-14	-23	28	132	142	-131	-46	-47	-66	-130	2
2	Δ Local & semi-government securities held by trading banks	ΔLGS_{MS}	0	4	5	1	-1	5	1	3	6	-7	-1
3	Δ Local & semi-government securities held by savings banks		137	107	129	159	165	149	160	189	287	393	466
4	Δ Other securities held by trading banks	ΔOS_{MS}	4	8	1	23	28	17	35	67	78	74	45
5	Δ Other securities held by savings banks		2	0	0	1	3	9	1	9	14	-20	28
6	Δ Fixed assets of trading banks	ΔFA_{MS}	9	10	3	3	10	18	13	-25	31	23	45
7	Δ Fixed assets of savings banks		6	6	7	8	8	8	6	6	9	14	39
8*	Δ Reserves of trading banks	ΔR_{MS}	7	7	15	16	19	20	19	32	42	39	37
9*	Δ Reserves of savings banks		11	11	10	12	10	3	23	22	24	22	28
10*	Δ Shareholders funds of trading banks	ΔSF_{MS}	13	19	13	19	35	29	36	38	95	73	43
11*	Δ Shareholders funds of savings banks		4	1	0	0	1	6	7	0	6	4	2
12	Δ Advances of Reserve Bank Rural Credits Department	ΔARB_{PNMS}	112	-68	186	-131	250	-122	-49	-48	-55	-4	1
13*	Bonds sold by local & semi-govts. (other than Australian govt. bonds)	Residual Identified Components of XM	296	250	257	281	345	318	383	505	485	528	634
14	Australian govt. transfers overseas		106	127	150	152	158	179	184	205	252	288	349
15	Government advances to public financial enterprises		22	32	26	28	25	22	60	60	64	76	257
16	Australian govt. advances overseas		46	11	84	130	73	63	61	23	29	-68	55
17	Government advances to private sector		119	105	85	107	67	273	58	84	31	116	281
18	Government subsidies paid		109	151	173	179	258	244	286	406	351	330	319
19	Government grants for private capital purchases		35	59	59	80	53	59	62	69	90	112	190

APPENDIX II QUARTERLY MACRO DATA*

	d	k	x	i	y	p	p_g
58.3	2593.	0.0016	484.	506.	3073.	0.812	0.712
58.4	2603.	0.0034	517.	506.	3155.	0.816	0.719
59.1	2618.	0.0051	513.	464.	3113.	0.819	0.722
59.2	2664.	0.0049	537.	512.	3197.	0.829	0.726
59.3	2721.	0.0038	552.	553.	3283.	0.828	0.751
59.4	2770.	0.0061	619.	582.	3349.	0.834	0.757
60.1	2820.	0.0092	580.	597.	3419.	0.838	0.775
60.2	2866.	0.0106	522.	637.	3476.	0.848	0.783
60.3	2882.	0.0117	549.	688.	3586.	0.864	0.814
60.4	2877.	0.0107	537.	701.	3532.	0.869	0.793
61.1	2839.	0.0081	602.	696.	3484.	0.862	0.800
61.2	2819.	0.0075	719.	600.	3452.	0.856	0.797
61.3	2836.	0.0079	668.	544.	3436.	0.872	0.814
61.4	2859.	0.0064	687.	529.	3476.	0.872	0.819
62.1	2937.	0.0083	688.	588.	3623.	0.869	0.823
62.2	2998.	0.0085	681.	633.	3697.	0.873	0.831
62.3	3030.	0.0093	639.	661.	3745.	0.873	0.827
62.4	3067.	0.0098	686.	678.	3815.	0.874	0.831
63.1	3124.	0.0130	696.	670.	3833.	0.891	0.835
63.2	3145.	0.0095	648.	694.	3862.	0.896	0.844
63.3	3227.	0.0111	781.	703.	4026.	0.903	0.852
63.4	3289.	0.0120	796.	710.	4146.	0.905	0.868
64.1	3294.	0.0117	769.	766.	4055.	0.926	0.882
64.2	3362.	0.0156	768.	816.	4201.	0.923	0.889
64.3	3412.	0.0145	750.	845.	4289.	0.935	0.915
64.4	3454.	0.0153	773.	901.	4403.	0.939	0.912
65.1	3493.	0.0135	785.	902.	4432.	0.940	0.930
65.2	3520.	0.0183	798.	931.	4536.	0.944	0.920
65.3	3543.	0.0173	817.	991.	4479.	0.957	0.954
65.4	3533.	0.0170	767.	950.	4438.	0.965	0.939
66.1	3560.	0.0163	776.	871.	4463.	0.970	0.947
66.2	3610.	0.0130	786.	851.	4492.	0.980	0.956
66.3	3665.	0.0154	826.	877.	4655.	0.989	0.994
66.4	3705.	0.0135	821.	890.	4719.	0.993	0.988
67.1	3761.	0.0135	878.	975.	4827.	1.003	1.000
67.2	3815.	0.0118	952.	973.	4879.	1.008	1.019
67.3	3865.	0.0129	897.	960.	4822.	1.014	1.040
67.4	3945.	0.0134	922.	974.	4898.	1.022	1.041
68.1	4001.	0.0136	934.	1145.	5004.	1.032	1.055
68.2	4033.	0.0133	931.	1075.	5061.	1.044	1.059
68.3	4066.	0.0136	945.	1080.	5274.	1.042	1.068
68.4	4154.	0.0153	1024.	1067.	5419.	1.056	1.100
69.1	4243.	0.0135	988.	1051.	5466.	1.070	1.110
69.2	4321.	0.0157	1015.	1085.	5561.	1.077	1.122
69.3	4385.	0.0135	1161.	1155.	5646.	1.087	1.154
69.4	4461.	0.0131	1152.	1180.	5735.	1.102	1.154
70.1	4510.	0.0135	1209.	1178.	5727.	1.121	1.187
70.2	4535.	0.0135	1220.	1211.	5904.	1.127	1.209
70.3	4578.	0.0137	1244.	1203.	5901.	1.140	1.232
70.4	4620.	0.0145	1250.	1216.	5912.	1.158	1.270

* The data are based on May 1977 estimates, and are prior to any timing corrections excepting P_i which is converted into mid period US dollars using a FORMA'd (log space) end of period$US exchange rate.

(iv) CONSTRUCTION OF MACRO DATA

x	=	XPO
i	=	MGS
*R	=	FR_o + cum (DFR)
T_2	=	TIT$
*M	=	$IM_4$$
sd	=	DIS
*B	=	MG$ + PG$
*A	=	SBM$ + SOL$ + SM$ + TAL$ + TM$ + BSM$
*v	=	(KSN_o + cum (SNN)) + (KSF_o + cum (SFM))
L	=	NNC + NDF + FE
UR	=	1-L/(L + NUN)
d	=	CON + IDW
*K	=	KOB + KPE
		Where KOB = KOB_o+ cum (IOB - .015 KOB_{-1})
		KPE = KPE_o+ cum (IPE - .04KPE_{-1})
g	=	DG
P_g	=	DG$/DG
*K_g	=	KG_o + cum (DP - .018 K_g-1)
P	=	GTM$/GTM
y	=	GTM - .015 KOB-1 - .04 KPE_{-1} - .018 K_g-1
W	=	(YWN$/ (NNC + NDF) .$\frac{1000}{13}$/55.19
		(YWN$/ (NNC + NDF)$_{66\text{-}67}$ $\frac{1000}{13}$ = $55.19)
T_1	=	$\left[\text{TP\$/RPT}\right]_{\text{seas. adjusted}}$. RPT + TC$
*E	=	1/(US$/A$)
t_3	=	TCD$/MGS$
*p_i	=	(MGS$/1)/E
P_x	=	XPO$/x
T_2	=	T_2/S$
		Where S$ = d.P + g.P_g + x.P_x+ (ΔK + ΔK_g).P
t_1	=	T_1/P.y
*F	=	F_o + cum (R - x.P_x - i. P_i .E)
P_w	=	PW(US)$_{70}$/0.8675
		(PW(US)$_{70}$/$_{66\text{-}67}$ = 0.8675)
W_A	=	(WAW$/43.24)/P
		(WAW$$_{66\text{-}67}$ = 43.24)
*t	=	QTTM - 97.0
*r	=	RGS10/100.0
*r_w	=	RW/100.0
c	=	TCB$/P
XM	=	ΔM - (ΔR + P. [ΔKg + .018 Kg-1] + P_g.g + P.c - T_1 -T_2 -ΔB + ΔA)
k	=	D log K

* Stock variables that are FORMA'd (in the logarithms as a timing correction (E is FORMA'd in the logarithms in the calculation of P_i). After that operation all variables are timed at the middle of the quarter; an additional FORMA operation is then applied to all variables to bring the timing back to the start of the quarter; to agree with the timing of the dependent variable data which are in first difference form. (The endogenous variables are timed at the start of the quarter by expressing the data as the lagged value plus one half of the difference so that the only current endogenous data are the endogenous variables in difference form).

20*	Other taxes, fees, fines	249	257	287	325	368	391	408	439	488	560	590
21*	Govt. net interest etc. receipts	-382	-402	-433	-488	-517	-551	-555	-611	-669	-652	-743
22*	Gross govt. enterprise income	713	757	800	884	1006	1116	1133	1279	1306	1256	1135
23*	Net proceeds from sale of govt. assets	-22	-16	-35	-27	-14	-29	-48	-113	-63	-194	-356
24	Increase in stocks	13	23	6	-3	8	4	62	-14	-44	57	381
25	(P_K - P)(ΔK_g + DEP)	-14	-20	2	13	27	39	54	49	57	-58	162
	XM estimate (obtained by summation of identified components)	-169	-306	-26	-404	-263	-205	-366	-461	-448	-180	1245
	XM (as calculated from Eqn. (3.9))	-99	-544	-341	-528	-441	-490	-638	-607	-204	-510	936
	Unidentified residual in money supply identity	70	-238	-315	-124	-178	-285	-272	-146	244	-330	-309
	Change in volume of money	827	644	973	1110	1390	1160	1490	2299	5430	3733	4535

* Error components entering the XM summation with a 'minus' sign.

Data Sources : Item 1 - RBA Statistical Bulletin Financial Supplement, September, 1972, and October, 1975, issues, table entitled "Financial Transactions of the Australian Government" (1973-74 and 1974-75 values obtained from RBA Statistical Bulletin, July, 1975, and July, 1976, issues, table entitled "Summary of Financial Transactions - Australian Government").

Items 2 - 12 - RBA Statistical Bulletin, Financial Flow Accounts Supplement, July, 1976, Table 3.2 - "Trading Banks' Aggregate Balance Sheet," Table 3.3 - "Savings Banks' Aggregate Balance Sheet," Table 3.1 - "Reserve Bank of Australia Aggregate Balance Sheet." 1974-75 values obtained from Reserve Bank.

Items 13 - 24 - ASB Australian National Accounts - National Income and Expenditure, 1975-76, Tables 41 - 45.

Item 25 - P_k is derived from ABS Quarterly Estimates of National Income and Expenditure, Tables 3 and 4.

linearized for FIML estimation with a Taylor expansion in the logarithms of the variables (see Bacon and Johnston [4]), the indirect taxes identity and the balance of payments, money supply and inventory change identities do not then hold exactly.

The residuals due to truncation of the Taylor expansion[1] of the indirect taxes and balance of payments change identities are therefore calculated and included as exogenous variables (TRES and FRES respectively) in the linearized identities. A similar approach is adopted for the money supply and inventory change identities; however, in linearizing these identities, the non-linear identity residuals, XM and sd respectively, are omitted, so that the exogenous variables, MRES and VRES respectively, included in the linearized money supply and inventory change identities consist of a linearization error plus the respective non-linear identity residual. It must be realized, however, that the identities thus treated will hold exactly during estimation and dynamic simulation only for the sample values of the variables involved (i.e., those values used to calculate the residuals). Notwithstanding, the use of the residual items should improve the approximations to the identities and hence parameter estimates. However, there remains the problem of constructing values for these residuals in the post-sample period. Here the user might calculate the magnitudes of the residuals based on an expected simulation path. If the observed path were significantly different than expected, the residuals could be recalculated.

1. It has been demonstrated by Bacon and Johnston [4] that linearization introduces significant residual error which may introduce bias in parameter estimates and hence model dynamics.

(iii) DESCRIPTION OF MACRO VARIABLES

x	Real exports of goods and services
i	Real imports of goods and services
R	Foreign Exchange Reserves
T_2	Indirect tax receipts
M	Volume of money (M4)
sd	Statistical discrepancy
B	Australian government bonds held by private (non-bank, non-permanent building societies) sector
A	Bank advances to private sector
v	Real stock of inventories
L	Employment
UR	Unemployment rate
d	Real household expenditure
K	Stock of real private capital
g	Real government final consumption expenditure
P	Government final consumption expenditure deflator
K^g	Stock of real government capital
P^g	Gross domestic product deflator
y	Real net domestic product
W	Average weekly earnings
T_1	Direct tax receipts
E	Exchange Rate ($A/$US)
t_3	Tariff rate
P_i	Imports deflator ($US)
P_x	Exports deflator
t_2	Expenditure tax rate
t_1	Income tax rate
F	Net Australian capital owned by overseas residents
P_w	World prices ($US)
W_A	Award wages
t	Time trend
r	Bond rate
r_w	World interest rate
c	Real cash benefits
XM	Money supply equation residual
k	Change in the log of the stock of real private capital
DEP	Depreciation of stock of real government capital+
QA	Dummy variable for requests by Reserve Bank to trading banks regarding advances outstanding
QE	Dummy variable for exchange rate expectations
QER	Dummy variable for timing of exchange rate changes
QF	Dummy variable for capital inflow controls
QS	Dummy variable for credit squeeze
QUS	Dummy variable for $US devaluation in 1973.1
QZ	Dummy variable for period of flexible exchange rates

+ This variable is replaced in the discrete specification by $.018\ K_{g-1}$ for estimation & simulation.

(ii) DATA REFERENCES

[1] Australian Statistician, Building Societies, Australia, Ref. No. 5.5, Australian Bureau of Statistics, Canberra (Annual).

[2] Australian Statistician, Employed Wage and Salary Earners: Australia, Ref. No. 6.12, Australian Bureau of Statistics, Canberra (monthly).

[3] Australian Statistician, Employment and Unemployment, Ref. No. 6.4, Australian Bureau of Statistics, Canberra (monthly).

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4. ANNUAL DATA

The annual data base is constructed from the quarterly data base. Timing requirements are handled correctly if the variables are classified according to :

(i) flow variables ;

(ii) "end of period" stock variables ; and

(iii) "mid period" stock variables.[1]

Appendix III contains a list of the model variables classified as above. The Appendix also contains a timing diagram showing the timing relationships of the variables for both quarterly and annual measures.

The annualization of the data is summarized by :

(i) an annual flow is the sum of the four corresponding quarterly flows ;

(ii) an annual 'end of period' stock is the corresponding fourth quarter 'end of period' stock ; and

(iii) an annual 'mid period' stock is the average of the sum of the four corresponding quarterly 'mid period stocks.'

Dummy variables do not have a continuous time equivalent and their conversion to annual form is not handled by the theory. From a pragmatic point of view, however, it would seem that dummy variables handled in the above manner would still convey valuable information to the annual model, and thus they are classified in the same way as the dependent variables of the equations in which they appear.

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1. See Bacon and Johnston [4] for a discussion of this classification.

The exogenous residuals in the linearized indirect taxes identity and the balance of payments, money supply and inventory change identities are also classified in the same way as their dependent variables. However, it should be noted that, because of the non-linearity (in the logarithms) of the identities, their values constructed as above will differ slightly from those calculated as the residuals of the annual linearized identities. Since their use is only to improve the identity approximations, the difference is not expected to cause significant problems.

TIT$ Total indirect taxes, $m. Seasonally unadjusted data are obtained from [6], Table 19 - "General Government Income and Outlay Account."

TM$ Trading banks loans outstanding to Short Term Money Market, average of weekly figures last month of quarter, $m. Seasonally unadjusted data are obtained from [16], table entitled "All Trading Banks Selected Liabilities and Assets Within Australia," and earlier data from [15], Table 44 - "All Trading Banks Liabilities and Assets Wtihin Australia."

*TP$ Personal income tax payments, seasonally unadjusted, $m. Is equal to gross PAYE tax payments less refunds of personal taxes (net tax instalments) plus 'other' personal income taxes, seasonally unadjusted data for net tax intalments and 'other' personal income taxes are available from [6], Table 22 - "Taxes, Fees, Fines, etc.."

*US$/A$ $US exchange rate at end of last month of quarter. End of month data are available from [16], table entitled "Exchange Rates."

*WAW$ Weekly award wages, adult males, Federal plus State awards, $. Monthly data are obtained from [8], Table 5 - "Weekly Wage Rates : Adult Males and Adult Females, All Groups." Quarterly data are obtained as a weighted average of end month data with weights 1/6, 1/3, 1/3, 1/6.

XPO Exports of goods and services, deliveries basis, 1966-67 prices, $m; from [6], Table 4 - "Expenditure on Gross Domestic Product at Average 1966-67 Prices - Seasonally Adjusted."

XPO$ Exports of goods and services, deliveries basis, $m; from [6], Table 3 - "Domestic Production Account - Seasonally Adjusted."

YWN$ Non-farm wages, salaries and supplements, $m. Total wages, salaries and supplements are available from [6], Table 3 - "Domestic Production Account - Seasonally Adjusted." Working estimates of seasonally adjusted farm wages, salaries and supplements are obtained from the ABS.

SFM Farm and miscellaneous increase in stocks, 1966-67 prices, $m; from [6], Table 9 - "Gross Fixed Capital Expenditure and Increase in Stocks at Average 1966-67 Prices - Seasonally Adjusted."

SM$ Savings banks loans outstanding to short term money market, average of end of last two months of quarter, $m. Seasonally unadjusted data are obtained from [16], table entitled "Savings Banks Selected Assets." Earlier data are obtained from [15], Table 76 - "All Savings Banks Liabilities and Assets Within Australia 1956-1970."

SNN Private non-farm (excluding 'miscellaneous') increase in stocks, 1966-67 prices, $m; from [6], Table 9 - "Gross Fixed Capital Expenditure and Increase in Stocks at Average 1966-67 Prices - Seasonally Adjusted."

*SOL$ Savings banks other lending - amount outstanding, average of end of last two months of quarter, $m. Data obtained from [16], table entitled "Savings Banks Selected Assets" as loans, advances and bills discounted other than housing. Earlier data to January 1960 are obtained from [15], Table 76 - "All Savings Banks Liabilities and Assets within Australia 1956-1970." A (stable) ratio of 0.1 is applied to total loans, advances and bills discounted (obtained from the same Table) to obtain data prior to March quarter 1960 for the other lending component. There is a break in the series in May 1970 - through to April 1970 deposits with, and loans to, prescribed banks other than trading banks are included in the loans, advances and bills discounted other than housing item; these deposits are subtracted out by applying a ratio of 0.57 to the series up to April 1970.

TAL$ Trading banks loans, advances and bills discounted - amount outstanding, average of weekly figures last month of quarter, $m. Seasonally unadjusted data are obtained from [16], table entitled "All Trading Banks Selected Liabilities and Assets Within Australia" and earlier data from [15], Table 44 - "All Trading Banks Liabilities and Assets Within Australia."

TC$ Company income tax payments, $m. Seasonally unadjusted data are available from [6], Table 22 - "Taxes, Fees, Fines, etc." Company taxes were paid by instalments 1973-74 through 1975-76 precluding any reliable seasonal adjustment beyond 1973.2; interpolated data are used beyond 1973.2

TCB$ Cash benefits to persons, $m. Seasonally unadjusted data are available from [6], Table 14 - "Household Income and Outlay Account."

TCD$ Customs duties, $m. Seasonally unadjusted data are available from [6], Table 22 - "Taxes, Fees, Fines, etc.."

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[2] Australian Statistician, Balance of Payments, Ref. No. 8.2, Australian Bureau of Statistics, Canberra (quarterly).

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APPENDIX I : DERIVATION OF MACRO DATA

(i) SOURCE DATA[ϕ]

*BSM$ Permanent Building Societies' mortgages outstanding to individuals, $m, average of last two months of quarter. Data are obtained from [4], Table 2 - "Summary of Monthly Operations - Australia" (earlier data back to 1969.2 obtained from [5], Table 2 - "Loans on Mortgages, Share Capital, Secured and Unsecured Borrowings;" end of year data from 1961-62, although not strictly comparable, may be obtained from [1] (these data are adjusted in line with the quarterly data by a comparison of the quarterly and annual data during the overlapping period). End of year data from 1958-59 to 1966-67 on mortgages outstanding to all building societies are obtained from [14], Table 5.1 - "Building Societies Aggregate Balance Sheet;" the proportion of mortgages outstanding to permanent building societies to total building societies is extrapolated back to 1958-59 to obtain permanent building societies annual data from 1958-59 to 1960-61. The annual data are interpolated[+] to quarterly data.

CON Total private final consumption expenditure, 1966-67 prices, $m; from [6], Table 4 - "Expenditure on Gross Domestic Product at Average 1966-67 Prices - Seasonally Adjusted."

DFR Change in official reserve assets excluding valuation effects, $m. Seasonally unadjusted data from 1972-73 onwards are obtained from [16], table entitled "International Liquidity" (bracketed figures give monthly changes excluding valuation effects). Earlier data are obtained from the Reserve Bank of Australia.

DG Government Final Consumption expenditure, 1966-67 prices, $m; from [6], Table 4 - "Expenditure on Gross Domestic Product at Average 1966-67 Prices - Seasonally Adjusted."

DG$ Government Final Consumption expenditure, $m; from [6], Table 2 - "Domestic Production Account - Seasonally Adjusted."

DIS Statistical discrepancy, 1966-67 prices, $m; from [6], Table 4 - "Expenditure on Gross Domestic Product at Average 1966-67 Prices - Seasonally Adjusted."

ϕ Source data references appear in Section (ii) below.

* Source data is seasonally unadjusted.

\+ Minimizing the sum of squares of the second differences between successive quarterly values (see Boot, J.C.E., W. Feibes and J. H. C. Lisman, 'Further Methods of Derivation of Quarterly Figures from Annual Data,' Journal of Applied Statistics, Vol. 16).

*QS Dummy variable for credit squeeze, reflected largely in an increase in the bond rate.

QS = 1.0 1960.4
2.0 1973.2 - 1973.3

*QTIM Time trend (1959.3 = 100)

*QUS Dummy variable for $US devaluation in 1973.1

QUS = - 1.0 1973.1

*QZ Dummy variable for period of flexible exchange rates

QZ = 1.0 1971.4 - 1976.4

*RGS10 Theoretical yield on ten year Commonwealth govt. securities, average of Wednesdays of last month of quarter, %. Data are available from [16], table entitled "Interest Rates and Security Yields." Is obtained as the yield on rebateable bonds (scaled by 1.04) up to 1969.2, and the yield on non-rebateable bonds thereafter.

*RPT Index correcting for changes to the personal income tax payments tax rate scale. This rate is designed to take account of levies and rebates and other restructuring of the tax tables but not of any progressivity. The tax rate is an average of monthly tax rates. A tax payments change announcement will become effective for tax collections after one month (two months for January 1 announcements).

*RW US Government long dated (10 years or more) security yield, average of last month of quarter %; from [16], table entitled "Overseas Interest Rates and Government Security Yields."

SBM$ Savings banks housing loans outstanding to individuals, average of end of last two months of quarter, $m. Seasonally unadjusted data back to 1966.3 are obtained from [16], table entitled "Savings Banks Lending for Housing," and are then seasonally adjusted. Earlier data on total savings banks housing loans outstanding to January 1960 are obtained from [15], Table 76 - "All Savings Banks Liabilities and Assets Within Australia 1956-1970." Annual data on savings banks housing loans outstanding to building societies (obtained from [14], Table 2.3 - "Savings Banks Aggregate Balance Sheet) are interpolated and subtracted from total housing loans outstanding to obtain savings banks housing loans outstanding to individuals. The building society proportion of total housing loans is extrapolated back to obtain the data back to 1958.3.

PW(US)70 U.S. gross national product implicit price index (1970 = 1.0). The seasonally adjusted series is obtained from [12], U.S. Section, table entitled "National Income and Product."

*QA Dummy variable for requests by Reserve Bank to trading banks regarding advances outstanding.
QA = 1.0 1961.1 - 1961.2.

*QE Dummy variable for exchange rate expectations. If QE is negative (positive) a revaluation (devaluation) is expected.

QE =		
	- 0.0625	1972.1
	- 0.1250	2
	- 0.2500	3
	- 0.5625	4
	- 0.1250	1973.1
	- 0.2500	2
	- 0.5000	3
	0.0625	4
	0.1250	1974.1
	0.2500	2
	0.5000	3
	0.0000	4
	0.0625	1975.1
	0.1250	2
	0.2500	3
	0.1250	4
	0.2500	1976 1
	0.5000	2
	0.6000	3
	0.3000	4

*QER Dummy variable for timing of exchange rate changes. Takes on - 1.0 (+ 1.0) values in quarters corresponding to major revaluations (devaluations).

QER =		
	- 1.0	1971.4
	- 1.0	1972.4
	- 1.0	1973.3
	+ 1.0	1974.3
	+ 1.0	1975.3
	+ 1.0	1976.4

*QF Dummy variable for capital inflow controls. Is a dummy to take account of restrictions imposed in the form of variable deposit requirements (VDR's) with the Reserve Bank.

QF = 1.0 1973.1 - 1974.3

DP Public Authorities Gross fixed capital expenditure, 1966-67 prices, $m; from [6], Table 4 - "Expenditure on Gross Domestic Product at Average 1966-67 Prices - Seasonally Adjusted."

F_0 Base stock of net Australian capital owned by overseas residents, $m. A base stock of $2945m at the end of 1958.3 is obtained from the Reserve Bank of Australia as the sum of the two capital account items, liability to overseas residents on direct investment account and portfolio investment and institutional loans accounts, at replacement value.

FE Farm employment, ('000). Seasonally unadjusted males, married females and unmarried females middle month of quarter data back to 1964.1 are obtained from [7], Table 1 - "Civilian Population 15 Years of Age and Over, by Employment Status." The data are seasonally adjusted, and extrapolated back by the Reserve Bank of Australia on the basis of regression coefficients for the regression of unadjusted farm employment on non-farm employment, seasonal factors and a time trend over the period 1964.1 to 1975.2, and dividing by extrapolated implicit seasonal features.

FR_0 Base stock of official reserve assets excluding valuation effects, $m. A base stock of $941m at the end of 1959.2 is obtained from the Reserve Bank of Australia.

GTM Gross domestic product at market prices, 1966-67 prices, $m; from [6], Table 4 - "Expenditure on Gross Domestic Product at Average 1966-67 Prices - Seasonally Adjusted."

GTM$ Gross domestic product at market prices, $m; from [6], Table 3 - "Domestic Production Account - Seasonally Adjusted."

IDW Private gross fixed capital expenditure on dwellings, 1966-67 prices, $m; from [6], Table 9 - "Gross Fixed Capital Expenditure and Increase in Stocks at Average 1966-67 Prices - Seasonally Adjusted."

IOB Private gross fixed capital expenditure on other buildings and construction, 1966-67 prices, $m; from [6], Table 9 - "Gross Fixed Capital Expenditure and Increase in Stocks at Average 1966-67 Prices - Seasonally Adjusted."

IPE Private gross fixed capital expenditure on plant and equipment, 1966-67 prices, $m; from [6], Table 9 - "Gross Fixed Capital Expenditure and Increase in Stocks at Average 1966-67 Prices - Seasonally Adjusted."

KG_0 Public authorities base capital stock, 1966-67 prices, $m. A base stock figure of $19314m at the end of 1959.2 is based on Clark [9]. (Clark calculates a public capital stock figure of $17890m for 1958-59 end of period stocks in US$ of 1950 purchasing power). A depreciation rate of 1.8% per quarter is obtained as a weighting of KOB and KPE (see below) depreciation rates, using as weights the 1958-59 to 1968-69 average proportion of public capital plant and equipment stocks to total public stocks (0.123) obtained from Clark's estimates.

KOB_0 Base stock of private other building and construction, 1966-67 prices, $m. A base stock figure of $4801m at the end of 1959.2 and a depreciation rate of 1.5% per quarter are obtained from [11], Appendix 2.

KPE_0 Base stock of private plant and equipment, 1966-67 prices, $m. A base stock figure of $6926m at the end of 1959.2 and a depreciation rate of 4% per quarter are obtained from [11], Appendix 2.

KSF_0 Base stock of farm and miscellaneous inventories, 1966-67 prices, $m. A farm stocks value of $400m at the end of 1958.2 is obtained as Helliwell's [10] farm stocks estimate.

KSN_0 Base stock of total private non-farm (miscellaneous stocks negligible) inventories, 1966-67 prices, $m. A base figure of $3739m at the end of 1959.3 is derived by the ABS.

LM4$ Volume of money, $m. Currency plus current deposits, fixed deposits, certificates of deposits of the private sector excluding inter-bank deposits, with the trading banks, plus deposits with all savings banks (M3) are available in seasonally adjusted form, average of weekly figures for last month of quarter; from [16], table entitled "Volume of Money," and early, unadjusted data from [15], Table 113, "Volume of Money, 1939-1970." LM4$ is obtained by adding to M3 the average of last two months of quarter data for shareholders funds and unsecured borrowings of permanent building societies; the unadjusted data are obtained from [4], Table 5 - "Transactions in Share Capital and Borrowings - States" (earlier data back to 1969.2 obtained from [5], Table 2 - "Loans on Mortgages, Share Capital, Secured & Unsecured Borrowings;" annual data from 1961-62 to 1968-69 may be obtained from [1], and these annual data are extended back to 1958-59 by assuming that the growth rate of shareholders funds plus unsecured borrowings of permanent building societies is the same as the growth rate in all building societies 'shares in co-ops' plus 'ordinary, including preference shares' plus 'deposits' (obtained from [14] - December, 1966 [Table 5.1 - "Building Societies Aggregate Balance Sheet"] and 1953-54 to 1961-62 [Table 5.4] Volumes.) Quarterly data to 1969 are obtained by interpolation).

MG$ Short-term money market holdings of Australian government securities at end of quarter, $m. Seasonally unadjusted end of quarter data are obtained from [13], [16], table entitled "Government Securities Classified by Holder."

MGS Imports of goods and services, deliveries basis, 1966-67 prices, $m; from [6], Table 4 - "Expenditure on Gross Domestic Product at Average 1966-67 Prices - Seasonally Adjusted."

MGS$ Imports of goods and services, deliveries basis, $m; from [6], Table 3 - "Domestic Production Account - Seasonally Adjusted."

NDF Permanent Defence Forces ('000). Monthly seasonally unadjusted males and females employment data are available from [3], Table 2 - "Civilian Employees : States and Territories" or [2], Table 2 - "Total Civilian Employees (Private and Government) and Defence Forces : Australia." Quarterly data are weighted averages of end month data with weights 1/6, 1/3, 1/3, 1/6. Males data are seasonally adjusted.

NNC Wage and salary earners in civilian non-farm employment ('000). Monthly seasonally unadjusted males and females civilian employment excluding farm and private domestic service are available from [3], Table 2 - "Civilian Employees : States and Territories" or [2], Table 2 - "Total Civilian Employees (Private and Government) and Defence Forces : Australia." Quarterly data are weighted averages of end month data with weights 1/6, 1/3, 1/3, 1/6. Males and females figures are seasonally adjusted separately, and estimates of private domestic services are added in.

NUN Non-school leavers registered for employment with CES ('000). Monthly seasonally unadjusted data are obtained from [3], Table 10 - "Registered Unemployed." Quarterly data are weighted averages of end month data with weights 1/6, 1/3, 1/3, 1/6.

PG$ Personal sector plus enterprise sector holdings of Australian government securities at end of quarter, $m. Seasonally unadjusted data for end of quarter for 'government plus private plus permanent building societies' are obtained from [13], [16], table entitled "Government Securities Classified by Holder" as 'total holdings' less "Reserve Bank,' 'Trading Banks,' 'Savings Banks' and Authorized Money Market Dealers' holdings. Government sector (Australian, State and local government) holdings (obtained from the Reserve Bank of Australia) and permanent building societies holdings (obtained by interpolation of annual ALL building societies government securities holdings divided by ALL building societies total assets less fixed assets less mortgages ([14], Table 5.1 - "Building Societies Aggregate Balance Sheet," with adjustment for data revision in 1972) multiplied by quarterly permanent building societies total shareholders funds plus unsecured borrowings plus secured borrowings less mortgages (see source for the permanent building societies component of LM4$) are then subtracted out.