Appendix 8.1: Composition and major export commodities as a proportion of total exports for Fiji, 1961–90

	Major export commodities					
Year	Sugar	Molasses	Coconut Oil	Gold	Forestry products	Marine products
1961	45.30	0.84	15.54	9.14	–	–
1962	52.91	0.57	9.24	7.56	–	–
1963	64.85	0.68	8.44	7.04	0.29	–
1964	68.27	0.69	8.71	5.30	0.46	–
1965	58.78	0.78	8.56	7.27	0.73	–
1966	55.90	1.11	7.40	7.79	1.34	–
1967	55.74	0.96	6.68	7.38	0.73	–
1968	49.49	0.81	9.71	6.86	0.65	–
1969	52.85	1.09	7.35	6.31	0.68	–
1970	51.07	0.77	8.23	5.20	0.43	–
1971	53.22	0.79	6.38	4.34	0.39	–
1972	52.49	0.75	3.63	6.07	0.29	–
1973	46.06	1.06	7.62	8.24	0.74	–
1974	54.11	1.02	8.67	6.97	0.79	–
1975	66.57	0.87	3.56	6.03	0.28	0.13
1976	55.26	0.71	3.72	5.92	0.78	0.82
1977	56.95	1.18	5.40	3.99	0.44	2.27
1978	50.02	2.72	5.37	2.97	0.86	5.23
1979	54.39	3.42	5.43	3.02	0.76	5.47
1980	57.01	3.92	2.14	4.06	1.34	2.80
1981	48.91	3.58	2.36	4.41	0.65	6.07
1982	46.75	1.90	2.31	5.82	0.61	3.41
1983	45.71	1.29	4.32	6.88	0.74	6.46
1984	39.25	2.38	6.59	7.32	1.57	5.13
1985	41.17	2.39	2.81	8.03	1.12	4.01
1986	42.83	2.53	1.25	12.37	1.27	5.34
1987	49.22	2.79	0.80	13.37	2.83	5.49
1988	44.53	2.55	0.77	18.30	4.19	8.92
1989	32.97	1.57	0.83	11.21	2.09	6.25
1990	34.89	2.21	0.61	9.65	1.94	4.93

Sources: Computed from various sources as described in Chapter 5.

Appendix 8.2: Composition and major export commodities as a proportion of total exports for PNG, 1961–90

	Major export commodities					
Year	Coffee	Cocoa	Copra	Coconut oil	Rubber	Tea
1961	9.40	12.10	27.80	11.80	7.30	–
1962	11.60	17.10	27.30	13.60	7.00	–
1963	14.00	17.60	25.80	11.90	6.50	0.08
1964	16.30	15.90	27.70	15.20	5.80	0.04
1965	16.70	8.30	27.20	11.20	4.90	0.02
1966	20.10	18.90	19.70	10.20	4.90	0.01
1967	24.30	20.10	23.60	11.70	3.40	0.07
1968	20.80	21.60	19.90	7.80	3.10	0.40
1969	22.70	17.50	14.90	6.50	3.20	0.79
1970	22.20	14.70	15.30	8.40	2.50	1.20
1971	19.30	10.40	8.80	5.60	1.90	1.41
1972	12.60	6.10	4.80	2.70	1.10	1.08
1973	8.00	6.50	6.60	3.80	1.00	0.72
1974	7.50	8.90	6.40	3.20	0.60	0.89
1975	12.60	8.50	3.60	2.20	0.80	1.19
1976	23.00	9.00	2.90	1.90	0.70	1.17
1977	26.60	16.00	4.30	2.30	0.50	1.82
1978	21.30	12.50	4.60	2.50	0.50	1.55
1979	18.20	8.70	5.60	3.00	0.50	1.16
1980	17.20	6.70	3.50	2.40	0.60	1.23
1981	13.20	6.00	3.40	2.20	0.60	1.26
1982	13.60	5.60	2.30	2.10	0.30	1.17
1983	13.80	6.00	3.50	2.90	0.30	1.51
1984	13.50	8.20	6.00	4.80	0.30	2.10
1985	12.70	6.80	3.60	2.60	0.40	1.24
1986	20.80	5.60	1.00	1.00	0.30	0.75
1987	12.00	5.00	1.40	1.30	0.30	0.50
1988	9.00	3.70	1.50	1.40	0.40	0.50
1989	12.60	4.10	1.30	1.40	0.20	0.55
1990	8.10	2.70	0.80	1.10	0.20	0.61

Sources: Computed from various sources as described in Chapter 5 of this thesis.

Appendix 8.2: Continued (PNG, 1961–90)

Year	Major export commodities					
	Palm oil	Gold	Logs	Forestry products	Marine products	Copper
1961	–	4.22	0.30	1.51	1.51	–
1962	–	3.76	1.86	3.59	2.03	–
1963	–	3.36	2.07	3.88	2.33	–
1964	–	2.45	1.36	3.15	2.01	–
1965	–	1.89	1.67	3.18	1.89	–
1966	–	1.77	2.76	4.53	1.57	–
1967	–	1.36	2.89	4.59	2.55	–
1968	–	1.07	2.28	3.76	1.07	–
1969	–	0.90	1.35	2.70	1.46	–
1970	–	0.75	2.80	3.99	2.80	–
1971	0.47	0.75	4.99	6.87	4.89	20.98
1972	0.27	0.49	2.71	4.07	2.66	48.81
1973	0.75	0.28	1.58	2.34	1.22	58.91
1974	1.51	0.35	2.57	3.72	3.08	52.45
1975	2.02	1.01	2.29	3.27	3.01	59.39
1976	1.56	0.46	1.54	3.24	3.90	32.33
1977	1.59	15.65	2.04	3.13	3.76	20.56
1978	2.08	20.61	2.24	3.21	4.98	24.33
1979	2.10	23.83	2.98	4.08	3.03	26.77
1980	1.73	25.00	4.34	4.34	4.58	20.14
1981	2.52	28.16	5.58	5.58	4.85	23.85
1982	3.80	30.09	8.69	8.69	1.45	21.51
1983	3.45	29.22	6.28	6.28	1.18	23.42
1984	9.21	22.96	8.50	8.50	1.22	16.48
1985	6.65	34.42	6.31	6.37	1.31	17.73
1986	2.83	39.83	6.80	6.80	0.79	15.59
1987	2.13	37.65	9.17	9.17	0.98	25.10
1988	2.62	32.25	7.20	7.20	0.60	35.57
1989	3.45	28.51	8.10	8.10	0.73	31.03
1990	2.97	34.71	5.64	5.64	0.75	31.76

Sources: Computed from various sources as described in Chapter 5.

Appendix 8.3: Composition and major export commodities as a proportion of total exports for SI, 1961–90

	Major export commodities						
Year	Copra	Cocoa	Palm oil and Kernel	Gold	Forestry products	Fish	Marine products
1961	83.03	0.10	–	0.05	3.39	–	3.66
1962	86.77	0.25	–	0.46	6.46	–	2.12
1963	90.03	0.35	–	0.08	4.85	–	1.05
1964	86.70	0.47	–	0.10	9.36	–	1.21
1965	91.74	0.39	–	0.21	5.17	–	0.56
1966	80.80	0.59	–	0.24	12.00	–	0.69
1967	71.32	0.43	–	0.39	21.22	–	1.08
1968	65.52	0.94	–	0.36	25.45	–	0.79
1969	53.72	0.79	–	0.19	38.39	–	1.27
1970	50.91	0.70	–	0.14	39.83	–	1.82
1971	42.18	0.55	–	0.11	36.12	13.66	14.54
1972	19.91	0.33	–	0.22	29.65	39.17	40.15
1973	29.42	0.52	–	0.63	39.79	16.13	17.38
1974	49.37	0.38	–	0.38	23.45	20.38	20.82
1975	39.42	0.93	–	0.68	26.48	23.52	24.87
1976	18.20	1.00	6.07	0.30	31.28	37.04	38.05
1977	26.98	1.86	10.74	0.20	26.65	27.96	28.57
1978	30.99	1.82	15.39	0.27	21.61	22.91	23.43
1979	27.12	1.10	12.30	0.29	26.78	28.57	29.04
1980	17.30	1.05	11.58	0.99	26.25	38.13	38.67
1981	13.99	1.55	13.06	1.08	27.92	38.85	38.85
1982	14.29	1.63	12.80	0.74	40.40	24.70	25.28
1983	11.75	3.17	12.36	0.70	28.03	42.40	43.15
1984	27.16	2.84	14.58	0.61	25.35	24.29	24.87
1985	22.35	4.83	13.25	0.77	23.83	30.79	31.63
1986	5.18	5.63	5.24	1.93	31.11	46.08	47.13
1987	6.49	7.17	5.95	1.64	28.97	42.54	44.51
1988	9.18	4.37	8.21	0.89	23.33	45.96	48.57
1989	12.13	4.63	11.63	0.64	23.91	37.78	41.50
1990	6.22	6.28	10.93	0.68	34.55	30.22	33.81

Sources: Computed from various sources as described in Chapter 5.

Appendix 8.4: World market share (in %) of major export commodities for Fiji, 1961–90

Year	Major export commodities				
	Sugar	Molasses	Coconut Oil	Forestry products	Marine products
1961	0.70	0.01	6.73	–	–
1962	1.11	0.01	3.95	–	–
1963	1.62	0.02	4.07	0.00	–
1964	1.77	0.02	4.26	0.00	–
1965	1.61	0.02	3.21	0.01	–
1966	1.51	0.03	2.56	0.01	–
1967	1.59	0.03	2.89	0.00	–
1968	1.49	0.03	3.04	0.00	–
1969	1.59	0.03	3.42	0.00	–
1970	1.50	0.02	3.15	0.00	–
1971	1.36	0.02	2.31	0.00	–
1972	1.22	0.02	1.56	0.00	–
1973	0.95	0.02	2.82	0.00	–
1974	0.90	0.02	2.14	0.00	–
1975	0.97	0.01	1.43	0.00	0.00
1976	1.04	0.01	1.04	0.00	0.02
1977	1.34	0.03	1.59	0.00	0.04
1978	1.30	0.07	1.27	0.00	0.09
1979	1.54	0.10	1.30	0.00	0.10
1980	1.44	0.10	1.01	0.01	0.07
1981	1.02	0.08	1.02	0.00	0.12
1982	1.17	0.05	1.13	0.00	0.06
1983	1.02	0.03	1.42	0.00	0.10
1984	1.01	0.06	1.70	0.01	0.08
1985	1.09	0.06	0.91	0.01	0.06
1986	1.24	0.07	0.72	0.01	0.06
1987	1.61	0.09	0.42	0.02	0.06
1988	1.31	0.08	0.33	0.01	0.09
1989	1.19	0.06	0.52	0.01	0.08
1990	1.36	0.09	0.56	0.01	0.07

Sources: Computed from various sources as described in Chapter 5.

Appendix 8.5: World market shares (in %) of major export commodities for PNG, 1961–90

Year	Major export commodities					
	Coffee	Cocoa	Copra	Coconut oil	Rubber	Tea
1961	0.19	0.92	4.84	5.69	0.19	–
1962	0.24	1.40	4.95	5.66	0.19	0.00
1963	0.30	1.49	5.17	4.33	0.20	0.01
1964	0.34	1.51	5.44	5.61	0.23	0.00
1965	0.44	0.98	6.36	4.59	0.23	0.00
1966	0.47	2.44	5.03	4.08	0.21	0.00
1967	0.70	2.20	7.88	6.21	0.18	0.00
1968	0.68	2.79	6.99	3.58	0.29	0.05
1969	0.90	2.18	8.33	4.91	0.25	0.13
1970	0.75	1.75	9.68	4.65	0.23	0.18
1971	0.85	1.43	5.88	3.38	0.24	0.24
1972	0.86	1.84	5.61	3.22	0.26	0.32
1973	0.94	3.49	15.29	7.44	0.27	0.51
1974	1.12	3.62	15.53	3.31	0.16	0.67
1975	1.30	2.29	6.07	2.22	0.21	0.51
1976	1.53	2.78	7.39	2.12	0.17	0.61
1977	1.45	3.90	9.99	2.62	0.14	0.62
1978	1.35	2.51	13.32	2.11	0.12	0.62
1979	1.44	2.54	21.59	2.70	0.12	0.61
1980	1.42	2.26	20.38	3.13	0.13	0.64
1981	1.29	2.40	23.47	2.55	0.15	0.56
1982	1.14	2.17	15.62	2.80	0.08	0.55
1983	1.19	2.60	33.66	3.26	0.08	0.64
1984	1.14	2.64	32.64	4.37	0.08	0.67
1985	1.03	2.15	25.56	3.26	0.14	0.48
1986	1.41	1.84	18.18	2.24	0.11	0.38
1987	1.44	2.04	21.92	2.74	0.09	0.29
1988	1.25	1.91	24.46	2.78	0.10	0.34
1989	1.68	2.36	19.22	2.62	0.07	0.29
1990	1.20	1.40	14.45	2.10	0.05	0.25

Sources: Computed from various sources as described in Chapter 5.

Appendix 8.5: Continued (PNG, 1961–90)

Year	Major export commodities				
	Palm oil	Logs	Forestry products	Marine products	Copper
1961	–	0.00	0.01	0.04	–
1962	–	0.01	0.02	0.05	–
1963	–	0.01	0.03	0.07	–
1964	–	0.01	0.02	0.06	–
1965	–	0.01	0.02	0.06	–
1966	–	0.02	0.03	0.04	–
1967	–	0.02	0.03	0.08	–
1968	–	0.02	0.03	0.04	–
1969	–	0.01	0.02	0.06	–
1970	–	0.02	0.03	0.09	–
1971	0.21	0.05	0.06	0.15	0.59
1972	0.22	0.04	0.06	0.11	3.74
1973	0.98	0.04	0.05	0.11	6.71
1974	1.08	0.06	0.08	0.33	3.70
1975	0.91	0.04	0.06	0.21	4.44
1976	1.10	0.03	0.06	0.29	2.44
1977	0.96	0.04	0.06	0.28	1.94
1978	1.24	0.04	0.06	0.31	2.15
1979	1.16	0.06	0.08	0.21	2.56
1980	0.89	0.08	0.08	0.32	1.55
1981	1.20	0.09	0.09	0.25	1.89
1982	1.77	0.15	0.15	0.07	1.77
1983	1.61	0.11	0.11	0.07	1.82
1984	2.98	0.16	0.16	0.07	1.55
1985	2.33	0.12	0.12	0.07	1.74
1986	1.61	0.12	0.12	0.04	1.68
1987	1.39	0.15	0.15	0.04	2.75
1988	1.51	0.12	0.12	0.03	2.73
1989	1.75	0.11	0.11	0.03	1.74
1990	1.39	0.07	0.07	0.02	1.59

Sources: Computed from various sources as described in Chapter 5.

Appendix 8.6: World market shares (in %) of major export commodities for SI, 1961–90

Year	Major export commodities					
	Copra	Palm oil and Cocoa	Kernel	Forestry products	Fish[b]	Marine products
1961	1.68	0.00	–	0.00	–	0.01
1962	1.49	0.00	–	0.00	–	0.01
1963	1.73	0.00	–	0.00	–	0.00
1964	1.55	0.00	–	0.01	–	0.00
1965	1.98	0.00	–	0.00	–	0.00
1966	1.53	0.01	–	0.01	–	0.00
1967	2.07	0.00	–	0.01	–	0.00
1968	1.72	0.01	–	0.02	–	0.00
1969	2.18	0.01	–	0.02	–	0.00
1970	2.48	0.01	–	0.03	–	0.01
1971	2.40	0.01	–	0.03	0.04	0.04
1972	1.16	0.01	–	0.02	0.08	0.08
1973	1.81	0.01	–	0.02	0.04	0.04
1974	4.84	0.01	–	0.02	0.09	0.09
1975	2.32	0.01	–	0.02	0.06	0.06
1976	2.15	0.01	1.36	0.02	0.12	0.12
1977	3.02	0.02	2.71	0.03	0.10	0.10
1978	4.80	0.02	3.56	0.02	0.08	0.08
1979	7.47	0.02	2.83	0.04	0.14	0.14
1980	7.07	0.03	3.35	0.03	0.19	0.19
1981	7.57	0.05	4.09	0.04	0.16	0.16
1982	7.43	0.05	3.63	0.05	0.09	0.10
1983	8.53	0.10	2.57	0.04	0.17	0.17
1984	9.03	0.09	2.80	0.05	0.14	0.14
1985	8.99	0.12	2.75	0.03	0.13	0.13
1986	6.04	0.12	1.98	0.04	0.13	0.14
1987	5.45	0.15	1.44	0.03	0.10	0.10
1988	8.22	0.13	1.74	0.02	0.12	0.13
1989	8.74	0.16	2.30	0.02	0.09	0.10
1990	6.88	0.20	2.47	0.02	0.06	0.07

Sources: Computed from various sources as described in Chapter 5.

Appendix 8.7: Export performance indices, Fiji, 1961–90

Year	Performance indices			
	Exports	World demand	Competitiveness	Diversification
1961	100.00	100.00	100.00	100.00
1962	119.94	100.53	146.29	110.90
1963	168.88	123.02	253.51	135.04
1964	199.09	130.23	290.65	142.12
1965	161.93	119.27	228.70	122.67
1966	148.34	113.58	207.52	116.48
1967	161.33	109.63	214.67	115.94
1968	170.39	98.13	182.39	104.15
1969	184.59	95.97	206.04	110.20
1970	216.31	96.02	185.63	106.83
1971	217.22	94.64	173.71	110.70
1972	240.18	109.60	152.58	108.65
1973	283.38	117.05	110.13	96.43
1974	464.05	225.08	120.18	113.17
1975	523.56	307.53	151.72	137.66
1976	412.69	230.58	135.76	114.39
1977	541.39	266.45	193.25	118.23
1978	593.96	293.16	224.18	104.60
1979	777.64	384.68	297.58	113.69
1980	1129.31	422.05	273.01	118.25
1981	952.57	331.68	225.07	102.17
1982	867.67	277.53	160.21	96.99
1983	728.10	296.79	171.60	95.79
1984	782.78	273.29	154.59	83.07
1985	712.08	231.93	149.98	85.77
1986	833.84	272.17	181.17	89.35
1987	933.84	364.55	260.94	102.60
1988	941.39	412.29	243.59	94.32
1989	1287.01	281.24	153.08	69.52
1990	1606.95	332.95	174.97	73.01

Note: Applying Love's (1984) suggestions, all data series were deflated to 1961 prices.
Sources: Computed from various sources as described in Chapter 5.

Appendix 8.8: Export performance indices, PNG, 1961–90

Year	Performance indices			
	Exports	World demand	Competitiveness	Diversification
1961	100.00	100.00	100.00	100.00
1962	104.32	114.76	141.38	108.82
1963	116.76	125.22	157.22	107.03
1964	134.32	128.87	159.30	104.44
1965	156.92	126.43	153.60	102.02
1966	152.70	125.01	216.11	104.21
1967	176.76	147.09	304.15	120.02
1968	224.05	143.70	277.08	107.26
1969	267.30	129.17	286.56	95.88
1970	279.46	137.12	283.75	93.49
1971	326.49	155.72	341.06	96.92
1972	594.32	181.73	242.93	148.08
1973	1380.00	321.89	235.72	173.96
1974	1753.78	386.94	365.65	157.04
1975	1189.46	267.44	353.60	177.76
1976	1485.68	315.35	516.63	118.78
1977	1844.05	515.33	658.91	109.48
1978	1922.97	398.93	554.10	102.94
1979	2608.92	428.90	494.10	100.00
1980	2788.38	361.01	514.99	82.89
1981	2268.38	311.44	499.20	85.91
1982	2092.16	300.32	656.79	84.38
1983	2227.57	305.56	553.86	85.97
1984	2484.86	399.75	980.87	82.28
1985	2503.24	281.76	558.24	74.56
1986	2783.78	303.18	542.91	82.05
1987	3342.97	292.72	587.03	90.03
1988	3917.57	373.26	403.19	110.66
1989	3510.54	414.02	495.96	103.31
1990	3123.78	354.52	244.86	97.98

Note: Applying Love's (1984) suggestions, all data series were deflated to 1961 prices.
Sources: Computed from various sources as described in Chapter 5.

Appendix 8.9: Export performance indices, SI, 1961–90

Year	Performance indices			
	Exports	World demand	Competitiveness	Diversification
1961	100.00	100.00	100.00	100.00
1962	83.72	106.16	91.42	104.64
1963	97.67	119.14	107.00	108.40
1964	104.65	128.31	103.74	104.84
1965	125.58	147.88	125.06	110.47
1966	97.67	116.89	100.20	98.21
1967	132.56	125.20	125.86	89.47
1968	144.19	139.51	136.91	84.52
1969	167.44	132.47	170.22	79.39
1970	186.05	140.66	227.94	77.75
1971	239.53	148.74	278.27	70.94
1972	253.49	232.29	545.00	79.95
1973	313.95	323.66	227.88	65.98
1974	609.30	407.75	487.84	74.47
1975	360.47	242.37	337.71	70.39
1976	567.44	373.84	761.50	76.60
1977	762.79	401.27	587.52	67.53
1978	876.74	390.48	472.02	62.95
1979	1590.70	520.41	879.19	68.69
1980	1704.65	576.19	1267.36	76.73
1981	1539.53	525.95	1151.93	77.60
1982	1353.49	411.18	710.86	68.56
1983	1441.86	556.81	1314.87	82.82
1984	2165.12	488.56	990.78	63.72
1985	1630.23	368.09	954.51	68.17
1986	1534.88	426.33	1185.19	88.33
1987	1488.37	466.59	891.70	82.94
1988	1904.65	591.52	1070.13	86.58
1989	1753.49	479.18	829.52	76.27
1990	1618.60	560.69	602.03	70.59

Note: Applying Love's (1984) suggestions, all data series were deflated to 1960 prices.
Sources: Computed from various sources as described in Chapter 5.

Appendix 8.10: Optimal lags with corresponding degrees of freedom (df) used in F-distributions for the causality tests, Fiji

NO causality from	VAR in Levels			VAR in 1st Diffs[a]		
	Optimal lags AIC[b]	SC[c]	F–df	Optimal lags AIC[b]	SC[c]	F–df
	For external and domestic factors[d]					
(1) WGDP, WCPI, GDP and EXR						
	1	1	4, 24	1	1	4, 23
	2	2	8, 18	4	4	16, 5
(2) WGDP and WCPI						
	1	1	2, 26	1	1	2, 25
	2	2	4, 22	–	–	–
(3) WGDP						
	1	1	1, 27	1	1	1, 26
	–	2	2, 24	2	2	2, 23
	3	–	3, 21	–	–	–
(4) WCPI						
	1	1	1, 27	1	1	1, 26
(5) GDP and EXR						
	–	1	2, 26	1	1	2, 25
	2	–	4, 22	–	–	–
(6) GDP						
	1	1	1, 27	1	1	1, 26
(7) EXR						
	1	1	1, 27	1	1	1, 26

Notes: [a] VAR in 1st Diffs = VAR in first differences, [b] AIC = Akaike information criterion, [c] SC = Schwarz criterion [d] These are used for causality tests in Chapter 7.

Appendix 8.10: continued – (Fiji)

NO causality from	VAR in Levels Optimal lags AIC[b]	SC[c]	F–df	VAR in 1st Diffs[a] Optimal lags AIC[b]	SC[c]	F–df
			For export performance factors[d]			
(1) WD, CM and DV						
	1	1	3, 24	1	1	3, 23
(2) WD and CM						
	1	1	2, 25	1	1	2, 24
(3) WD and DV						
	1	1	2, 25	1	1	2, 24
(4) CM and DV						
	1	1	2, 25	1	1	2, 24
(5) WD						
	1	1	1, 26	1	1	1, 25
(6) CM						
	1	1	1, 26	1	1	1, 25
(7) DV						
	1	1	1, 26	1	1	1, 25

Notes: [a] VAR in 1st Diffs = VAR in first differences, [b] AIC = Akaike information criterion, [c] SC = Schwarz criterion [d] These are used for causality tests in Chapter 8.

Appendix 8.10: continued – (Fiji)

NO causality from	VAR in Levels Optimal lags AIC[b]	SC[c]	F–df	VAR in 1st Diffs[a] Optimal lags AIC[b]	SC[c]	F–df
			For export/GDP nexus[d]			
(1) Exports to GDP						
	1	1	1, 29	1	1	1, 28
(2) GDP to Exports						
	–	1	1, 29	1	1	1, 28
	2	–	2, 26	–	–	–

Notes: [a] VAR in 1st Diffs = VAR in first differences, [b] AIC = Akaike information criterion, [c] SC = Schwarz criterion [d] These are used for causality tests in Chapter 6.

Appendix 8.11: Optimal lags with corresponding degrees of freedom (df) used in F-distributions for the causality tests, PNG

NO causality from	VAR in Levels			VAR in 1st Diffs[a]		
	Optimal lags AIC[b]	SC[c]	F–df	Optimal lags AIC[b]	SC[c]	F–df
			For external and domestic factors[d]			
(1) WGDP, WCPI, GDP and EXR						
	1	1	4, 24	1	1	4, 23
	2	2	8, 18	2	2	8, 17
(2) WGDP and WCPI						
	1	1	2, 26	1	1	2, 25
	3	3	6, 18	2	2	4, 21
(3) WGDP						
	1	1	1, 27	1	1	1, 26
	3	3	3, 21	2	2	2, 23
(4) WCPI						
	1	1	1, 27	1	1	1, 26
	3	3	3, 21	2	2	2, 23
(5) GDP and EXR						
	1	1	2, 26	1	1	2, 25
	3	3	6, 18	2	2	4, 21
(6) GDP						
	1	1	1, 27	1	1	1, 26
	3	3	3, 21	2	2	2, 23
(7) EXR						
	–	1	1, 27	1	1	1, 26
	3	–	3, 21	2	2	2, 23

Notes: [a] VAR in 1st Diffs = VAR in first differences, [b] AIC = Akaike information criterion, [c] SC = Schwarz criterion [d] These are used for causality tests in Chapter 7.

Appendix 8.11: continued – (PNG)

NO causality from	VAR in Levels Optimal lags AIC[b]	SC[c]	F– df	VAR in 1st Diffs[a] Optimal lags AIC[b]	SC[c]	F– df
			For export performance factors[d]			
(1) WD, CM and DV						
	1	1	3, 24	1	1	3, 23
	3	3	9, 14	3	3	9, 13
(2) WD and CM						
	1	1	2, 25	1	1	2, 24
	–	2	4, 21	2	2	4, 20
	4	–	8, 13	–	–	–
(3) WD and DV						
	1	1	2, 25	1	1	2, 24
	4	4	8, 13	3	3	6, 16
(4) CM and DV						
	1	1	2, 25	1	1	2, 24
	3	3	6, 17	3	3	6, 16
(5) WD						
	1	1	1, 26	1	1	1, 25
	3	3	3, 20	2	2	2, 22
(6) CM						
	1	1	1, 26	1	1	1, 25
	–	2	2, 23	2	2	2, 22
	4	–	4, 17	–	–	–
(7) DV						
	1	1	1, 26	1	1	1, 25
	4	4	4, 17	–	3	3, 19
	–	–	–	4	–	4, 16

Notes: [a] VAR in 1st Diffs = VAR in first differences, [b] AIC = Akaike information criterion, [c] SC = Schwarz criterion [d] These are used for causality tests in Chapter 8.

Appendix 8.11: continued – (PNG)

NO causality from	VAR in Levels			VAR in 1st Diffs[a]		
	Optimal lags AIC[b]	SC[c]	F–df	Optimal lags AIC[b]	SC[c]	F–df
			For export/GDP nexus[d]			
(1) Exports to GDP						
	1	1	1, 29	1	1	1, 28
	–	3	3, 23	2	2	2, 25
	4	–	4, 20	–	–	–
(2) GDP to Exports						
	1	1	1, 29	1	1	1, 28
	3	3	3, 23	2	2	2, 25

Notes: [a] VAR in 1st Diffs = VAR in first differences, [b] AIC = Akaike information criterion, [c] SC = Schwarz criterion [d] These are used for causality tests in Chapter 6.

Appendix 8.12: Optimal lags with corresponding degrees of freedom (df) used in F-distributions for the causality tests, SI

NO causality from	VAR in Levels			VAR in 1st Diffs[a]		
	Optimal lags AIC[b]	SC[c]	F–df	Optimal lags AIC[b]	SC[c]	F–df
	For external and domestic factors[d]					
(1) WGDP, WCPI, GDP and EXR						
	1	1	4, 24	1	1	4, 23
	4	4	16, 6	4	4	16, 4
(2) WGDP and WCPI						
	1	1	2, 26	1	1	2, 25
	–	2	4, 22	–	–	–
	3	–	6, 18	–	–	–
(3) WGDP						
	1	1	1, 27	1	1	1, 26
(4) WCPI						
	1	1	1, 27	1	1	1, 26
	2	2	2, 24	–	–	–
(5) GDP and EXR						
	1	1	2, 26	–	1	2, 25
	3	3	6, 18	4	–	8, 13
(6) GDP						
	1	1	1, 27	1	1	1, 26
(7) EXR						
	1	1	1, 27	1	1	1, 26
	3	3	3, 21	–	2	2, 23
	–	–	–	4	–	4, 17

Notes: [a] VAR in 1st Diffs = VAR in first differences, [b] AIC = Akaike information criterion, [c] SC = Schwarz criterion [d] These are used for causality tests in Chapter 7.

Appendix 8.12: continued – (SI)

NO causality from	VAR in Levels: Optimal lags AIC[b]	SC[c]	F–df	VAR in 1st Diffs[a]: Optimal lags AIC[b]	SC[c]	F–df
			For export performance factors[d]			
(1) WD, CM and DV						
	1	1	3, 24	–	1	3, 23
	3	3	9, 14	3	–	9, 13
(2) WD and CM						
	1	1	2, 25	–	1	2, 24
	3	3	6, 17	2	–	4, 20
(3) WD and DV						
	1	1	2, 25	1	1	2, 24
	3	3	6, 17	–	–	–
(4) CM and DV						
	–	1	2, 25	1	1	2, 24
	2	–	4, 21	–	–	–
(5) WD						
	1	1	1, 26	1	1	1, 25
	2	2	2, 23	–	–	–
(6) CM						
	1	1	1, 26	1	1	1, 25
	2	2	2, 23	–	–	–
(7) DV						
	–	1	1, 26	1	1	1, 25
	3	–	3, 20	–	–	–

Notes: [a] VAR in 1st Diffs = VAR in first differences, [b] AIC = Akaike information criterion, [c] SC = Schwarz criterion [d] These are used for causality tests in Chapter 8.

Appendix 8.12: continued – (SI)

NO causality from	VAR in Levels: Optimal lags AIC[b]	SC[c]	F–df	VAR in 1st Diffs[a]: Optimal lags AIC[b]	SC[c]	F–df
			For export/GDP nexus[d]			
(1) Export to GDP						
	1	1	1, 29	1	1	1, 28
(2) GDP to exports						
	1	1	1, 29	1	1	1, 28

Notes: [a] VAR in 1st Diffs = VAR in first differences, [b] AIC = Akaike information criterion, [c] SC = Schwarz criterion [d] These are used for causality tests in Chapter 6.

Appendix 8.13: Impulse responses of export sector performance of selected SPINs

Year	Export responses from shock in: World demand	Competitiveness	Diversification	Exports
		FIJI		
		Levels		
1	0.0000	0.0000	0.0000	0.0000
2	0.0233	–0.0399	–0.0050	0.0801
3	0.0435	–0.0411	–0.0019	0.0697
4	0.0556	–0.0305	0.0011	0.0651
5	0.0600	–0.0183	0.0021	0.0623
8	0.0501	0.0024	–0.0032	0.0584
10	0.0412	0.0040	–0.0078	0.0587
13	0.0362	0.0003	–0.0115	0.0620
15	0.0371	–0.0019	–0.0122	0.0649
20	0.0430	–0.0034	–0.0127	0.0724
		1st Differences		
1	0.0000	0.0000	0.0000	0.1284
2	0.0378	0.0433	0.0314	0.0197
3	–0.0025	–0.0004	–0.0017	–0.0104
4	–0.0026	–0.0020	–0.0021	–0.0002
5	0.0005	0.0009	0.0004	0.0012
8	–0.0000	0.0001	0.0000	0.0000
10	0.0000	0.0000	0.0000	0.0000
13	0.0000	0.0000	0.0000	0.0000
15	0.0000	0.0000	0.0000	0.0000
20	0.0000	0.0000	0.0000	0.0000
		PNG		
		Levels		
1	0.0000	0.0000	0.0000	0.1248
2	0.0357	0.0213	0.0092	0.1326
3	0.0480	0.0294	0.0087	0.1317
4	0.0495	0.0316	0.0052	0.1259
5	0.0465	0.0310	0.0016	0.1176
8	0.0331	0.0249	–0.0046	0.0901
10	0.0260	0.0207	–0.0054	0.0743
13	0.0187	0.0156	–0.0048	0.0555
15	0.0153	0.0129	–0.0041	0.0458
20	0.0095	0.0081	–0.0026	0.0285

Note: Export impulse responses are in percentages to one standard deviation shock in other variables (world demand, competitiveness, diversification and exports) in level and 1st difference VAR models.

Appendix Table 8.13: continued (impulse responses)

Year	Export responses from shock in: World demand	Competitiveness	Diversification	Exports
		PNG		
		1st Differences		
1	0.0000	0.0000	0.0000	0.1309
2	0.0477	0.0015	0.0346	0.0710
3	0.0207	0.0018	0.0126	0.0407
4	0.0116	0.0005	0.0079	0.0215
5	0.0064	0.0005	0.0041	0.0118
8	0.0010	0.0001	0.0007	0.0019
10	0.0003	0.0000	0.0002	0.0006
13	0.0001	0.0000	0.0000	0.0001
15	0.0000	0.0000	0.0000	0.0000
20	0.0000	0.0000	0.0000	0.0000
		SOLOMON ISLANDS		
		Levels		
1	0.0000	0.0000	0.0000	0.1143
2	0.0007	0.0613	0.0286	0.0757
3	–0.0095	0.0075	0.0230	0.0322
4	–0.0196	–0.0166	0.0223	0.0012
5	–0.0287	–0.0351	0.0214	–0.0237
8	–0.0467	–0.0670	0.0181	–0.0727
10	–0.0513	–0.0756	0.0153	–0.0889
13	–0.0502	–0.0756	0.0108	–0.0949
15	–0.0458	–0.0698	0.0079	–0.0903
20	–0.0292	–0.0456	0.0022	–0.0630
		1st Differences		
1	0.0000	0.0000	0.0000	0.1160
2	–0.0836	0.0283	0.0312	–0.1018
3	0.0058	–0.0053	0.0078	–0.0361
4	0.0196	–0.0119	–0.0071	0.0276
5	–0.0050	0.0042	0.0005	0.0048
8	0.0012	–0.0007	–0.0006	0.0027
10	–0.0003	0.0000	0.0001	–0.0008
13	–0.0001	0.0001	0.0000	–0.0001
15	0.0000	–0.0000	–0.0000	0.0000
20	–0.0000	0.0000	0.0000	–0.0000

Note: Export impulse responses are in percentages to one standard deviation shock in other variables (world demand, competitiveness, diversification and exports) in level and 1st difference VAR models.

Appendix 9.1: Sample instruction program for VDM on SHAZAM, PNG

```
sample 1 30
file 12 png1.dta
file 13 png2.dta
file 14 png3.dta
file 15 png4.dta
read(12) NP1 NQ1 NP2 NQ2 NP3 NQ3
read(13) NP4 NQ4 NP5 NQ5 NP6 NQ6
read(14) NP7 NQ7 NP8 NQ8 NP9 NQ9
read(15) NP10 NQ10 NP11 NQ11 NP12 NQ12
sample 1 30
print NP1 NQ1 NP2 NQ2 NP3 NQ3 NP4 NQ4 NP5 NQ5 NP6 NQ6 NP7 NQ7 NP8 &
NQ8 NP9 NQ9 NP10 NQ10 NP11 NQ11 NP12 NQ12/wide
```

***** **Coffee** (1961–1990) *****

```
sample 1 30
gen1 TNP1 = sum(NP1,30)
gen1 ANP1 = TNP1/30
gen1 TNQ1 = sum(NQ1,30)
gen1 ANQ1 = TNQ1/30
genr NR1 = NP1*NQ1
gen1 TNR1 = sum(NR1,30)
gen1 ANR1 = TNR1/30
gen1 b = -100*(ANQ1/ANP1)
genr at = NQ1-b*NP1
gen1 d = 0.05*(ANQ1/ANP1)
genr ct = NQ1-d*NP1
genr atct = at*ct
genr at2 = at**2
genr ct = ct**2
gen1 PA1 = d/(d-b)**2
gen1 PA12 = (PA1)**2
gen1 PA2 = b/(d-b)**2
gen1 PA22 = (PA2)**2
genr NPt1 = (at-ct)/(d-b)
genr NQt1 = (at*d-ct*b)/(d-b)
genr NPtQt1 = PA1*(at**2)+PA2*(ct**2)-((PA1+PA2)*at*ct)
print b at d ct PA1 PA12 PA2 PA22 NPt1 NQt1 NPtQt1
stat NPt1 NQt1 NPtQt1/pcov
stat at/mean=ea variance=va
stat ct/mean=ec variance=vc
gen1 ea2 = ea**2
genr da = at-ea
genr da3 = da**3
genr da4 = da**4
gen1 eda3 = da3/30
gen1 eda4 = da4/30
gen1 ec2 = ec**2
genr dc = ct-ec
genr dc3 = dc**3
genr dc4 = dc**4
```

Appendix 9.1: continued (VDM – PNG)

```
gen1 edc3 = dc3/30
gen1 edc4 = dc4/30
stat at ct/cov=cac
matrix cac=(cac:1)'
gen1 cac=cac:2
print cac

***** Relationships in terms of Net Intercepts at & ct *****

gen1 vara2 = 4*ea2*va – va**2 + 4*ea*eda3 + eda4
gen1 varc2 = 4*ec2*vc – vc**2 + 4*ec*edc3 + edc4
gen1 varac = ec2*va + ea2*vc + 2*ea*ec*cac + ((da*dc–cac)/30)**2 + 2*ea*(da &
 *(dc**2))/30 + 2*ec*((da**2)*dc)/30
gen1 cova2c2 = 4*ea*ec*cac + ((da**2)*(dc**2))/30 + 2*ea*((dc**2)*da)/30 + &
 2*ec*((da**2)*dc)/30 – va*vc
gen1 cova2ac = 2*ea2*cac + 2*ea*ec*va + 3*ea*((da**2)*dc)/30 + ec*eda3 + &
 (da3*dc)/30 – va*cac
gen1 covc2ac = 2*ec2*cac + 2*ec*ea*vc + 3*ec*((dc**2)*da)/30 + ea*edc3 + &
 (dc3*da)/30 – vc*cac
print vara2 varc2 varac cova2c2 cova2ac covc2ac

***** The Variance of Revenue (PtQt1) *******

gen1 varPtQt1 = PA12*vara2 + PA22*varc2 + ((PA1+PA2)**2)*varac + 2*PA1*PA2 &
 *cova2c2 – 2*PA1*(PA1+PA2)*cova2ac – 2*PA2*(PA1+PA2)*covc2ac
print varPtQt1

****** Notice that varPtQt1 = R1DE + R1SE +R1IE ******

gen1 d1 = va*((4*ea2)*PA12+((PA1+PA2)**2)*ec2–4*PA1*(PA1+PA2)*ea*ec) – &
 (va**2)*PA12
gen1 d2 = eda3*(4*ea*PA12) – 2*ec*PA1*(PA1+PA2)
gen1 d3 = eda4*PA12
gen1 R1DE = d1+d2+d3
print d1 d2 d3 R1DE
gen1 s1 = vc*((4*ec2)*PA12+((PA1+PA2)**2)*ea2–4*PA1*(PA1+PA2)*ec*ea) – &
 (vc**2)*PA12
gen1 s2 = edc3*(4*ec*PA12) – 2*ea*PA1*(PA1+PA2)
gen1 s3 = edc4*PA12
gen1 R1SE = s1+s2+s3
print s1 s2 s3 R1SE
gen1 R1IE = varPtQt1–R1DE–R1SE
```

Appendix 9.1: continued (VDM – PNG)

```
***** Revenue Decomposition Results *****

print R1DE R1SE R1IE

***** Revenue Decomposition Proportions *****

gen1 CERV1 = R1DE + R1SE + R1IE
gen1 R1DE = (R1DE/CERV1)*100
gen1 R1SE = (R1SE/CERV1)*100
gen1 R1IE = (R1IE/CERV1)*100
print CERV1 R1DE R1SE R1IE

***** Price Decomposition Results *******

gen1 varP1t = va/(d–b)**2 + vc/(d–b)**2 – (2*cac)/(d–b)**2
gen1 P1DE = va/(d–b)**2
gen1 P1SE = vc/(d–b)**2
gen1 P1IE = –(2*cac)/(d–b)**2
gen1 PIE = varP1t–P1DE–P1SE
print varP1t P1DE P1SE P1IE PIE

***** Price Decomposition Proportions *****

gen1 CEPV1 = P1DE + P1SE + P1IE
gen1 P1DE = (P1DE/CEPV1)*100
gen1 P1SE = (P1SE/CEPV1)*100
gen1 P1IE = (P1IE/CEPV1)*100
print CERPV1 P1DE P1SE P1IE

***** Quantity Decomposition Results ******

gen1 varQ1t = ((d**2)*va)/(d–b)**2 + ((b**2)*vc)/(d–b)**2 – (2*b*d*cac)/(d–b)**2
gen1 Q1DE = ((d**2)*va)/(d–b)**2
gen1 Q1SE = ((b**2)*vc)/(d–b)**2
gen1 Q1IE = –(2*b*d*cac)/(d–b)**2
gen1 QIE = varQ1t–Q1DE–Q1SE
print varQ1t Q1DE Q1SE Q1IE QIE

***** Quantity Decomposition Proportions *****

gen1 CEQV1 = Q1DE + Q1SE + Q1IE
gen1 Q1DE = (Q1DE/CEQV1)*100
gen1 Q1SE = (Q1SE/CEQV1)*100
gen1 Q1IE = (Q1IE/CEQV1)*100
print CEQV1 Q1DE Q1SE Q1IE
```

Appendix 9.1: continued (VDM – PNG)

***** **Cocoa** (1961–1990) *****

```
sample 1 30
gen1 TNP2 = sum(NP2,30)
gen1 ANP2 = TNP2/30
gen1 TNQ2 = sum(NQ2,30)
gen1 ANQ2 = TNQ2/30
genr NR2 = NP2*NQ2
gen1 TNR2 = sum(NR2,30)
gen1 ANR2 = TNR2/30
gen1 b = –100*(ANQ2/ANP2)
genr at = NQ2–b*NP2
gen1 d = 0.05*(ANQ2/ANP1)
genr ct = NQ2–d*NP2
genr atct = at*ct
genr at2 = at**2
genr ct = ct**2
gen1 PA1 = d/(d–b)**2
gen1 PA12 = (PA1)**2
gen1 PA2 = b/(d–b)**2
gen1 PA22 = (PA2)**2
genr NPt2 = (at–ct)/(d–b)
genr NQt2 = (at*d–ct*b)/(d–b)
genr NPtQt2 = PA1*(at**2)+PA2*(ct**2) – ((PA1+PA2)*at*ct)
print b at d ct PA1 PA12 PA2 PA22 NPt2 NQt2 NPtQt2
stat NPt2 NQt2 NPtQt2/mean=1 variance=v1 covariance=v2
stat NPt2 NQt2 NPtQt2/pcov
stat at/mean=ea variance=va
stat ct/mean=ec variance=vc
gen1 ea2 = ea**2
genr da = at–ea
genr da3 = da**3
genr da4 = da**4
gen1 eda3 = da3/30
gen1 eda4 = da4/30
gen1 ec2 = ec**2
genr dc = ct–ec
genr dc3 = dc**3
genr dc4 = dc**4
gen1 edc3 = dc3/30
gen1 edc4 = dc4/30
stat at ct/cov=cac
matrix cac=(cac:1)'
gen1 cac=cac:2
print cac
```

***** Relationships in terms of Net Intercepts at & ct ********

```
gen1 vara2 = 4*ea2*va – va**2 + 4*ea*eda3 + eda4
gen1 varc2 = 4*ec2*vc – vc**2 + 4*ec*edc3 + edc4
gen1 varac = ec2*va + ea2*vc + 2*ea*ec*cac + ((da*dc–cac)/30)**2 + 2*ea*(da &
 *(dc**2))/30 + 2*ec*((da**2)*dc)/30
```

Appendix 9.1: continued (VDM – PNG)

```
gen1 cova2c2 = 4*ea*ec*cac + ((da**2)*(dc**2))/30 + 2*ea*((dc**2)*da)/30 + &
 2*ec*((da**2)*dc)/30 – va*vc
gen1 cova2ac = 2*ea2*cac + 2*ea*ec*va + 3*ea*((da**2)*dc)/30 + ec*eda3 + &
 (da3*dc)/30 – va*cac
gen1 covc2ac = 2*ec2*cac + 2*ec*ea*vc + 3*ec*((dc**2)*da)/30 + ea*edc3 + &
 (dc3*da)/30 – vc*cac
print vara2 varc2 varac cova2c2 cova2ac covc2ac

****** The Variance of Revenue (PtQt) ********

gen1 varPtQt2 = PA12*vara2 + PA22*varc2 + ((PA1+PA2)**2)*varac + 2*PA1*PA2 &
 *cova2c2 – 2*PA1*(PA1+PA2)*cova2ac – 2*PA2*(PA1+PA2)*covc2ac
print varPtQt2

******* Notice that varPtQt2 = R2DE + R2SE + R2IE  ******

gen1 d1 = va*((4*ea2)*PA12+((PA1+PA2)**2)*ec2–4*PA1*(PA1+PA2)*ea*ec) – &
 (va**2)*PA12
gen1 d2 = eda3*(4*ea*PA12)–2*ec*PA1*(PA1+PA2)
gen1 d3 = eda4*PA12
gen1 R2DE = d1+d2+d3
print d1 d2 d3 R2DE
gen1 s1 = vc*((4*ec2)*PA12+((PA1+PA2)**2)*ea2–4*PA1*(PA1+PA2)*ec*ea) – &
 (vc**2)*PA12
gen1 s2 = edc3*(4*ec*PA12) – 2*ea*PA1*(PA1+PA2)
gen1 s3 = edc4*PA12
gen1 R2SE = s1+s2+s3
print s1 s2 s3 R2SE
gen1 R2IE = varPtQt2–R2DE–R2SE

***** Revenue Decomposition Results ******

print R2DE R2SE R2IE

***** Revenue Decomposition Proportions *****

gen1 CERV2 = R2DE + R2SE + R2IE
gen1 R2DE = (R2DE/CERV2)*100
gen1 R2SE = (R2SE/CERV2)*100
gen1 R2IE = (R2IE/CERV2)*100
print CERV2 R2DE R2SE R2IE

****** Price Decomposition Results *******

gen1 varP2t = va/(d–b)**2 + vc/(d–b)**2 – (2*cac)/(d–b)**2
gen1 P2DE = va/(d–b)**2
gen1 P2SE = vc/(d–b)**2
gen1 P2IE = –(2*cac)/(d–b)**2
gen1 PIE = varP2t–P2DE–P2SE
print varP2t P2DE P2SE P2IE PIE
```

Appendix 9.1: continued (VDM – PNG)

```
***** Price Decomposition Proportions *****

gen1 CEPV2 = P2DE + P2SE + P2IE
gen1 P2DE = (P2DE/CEPV2)*100
gen1 P2SE = (P2SE/CEPV2)*100
gen1 P2IE = (P2IE/CEPV2)*100
print CERPV2 P2DE P2SE P2IE

****** Quantity Decomposition Results *******

gen1 varQ2t = ((d**2)*va)/(d–b)**2 + ((b**2)*vc)/(d–b)**2 – (2*b*d*cac)/ &
 (d–b)**2
gen1 Q2DE = ((d**2)*va)/(d–b)**2
gen1 Q2SE = ((b**2)*vc)/(d–b)**2
gen1 Q2IE = –(2*b*d*cac)/(d–b)**2
gen1 QIE = varQ2t–Q2DE–Q2SE
print varQ2t Q2DE Q2SE Q2IE QIE

***** Quantity Decomposition Proportions *****

gen1 CEQV2 = Q2DE + Q2SE + Q2IE
gen1 Q2DE = (Q2DE/CEQV2)*100
gen1 Q2SE = (Q2SE/CEQV2)*100
gen1 Q2IE = (Q2IE/CEQV2)*100
print CEQV2 Q2DE Q2SE Q2IE


***** Copra (1961–1990) ******

sample 1 30
gen1 TNP3 = sum(NP3,30)
gen1 ANP3 = TNP3/30
gen1 TNQ3 = sum(NQ3,30)
gen1 ANQ3 = TNQ3/30
genr NR3 = NP3*NQ3
gen1 TNR3 = sum(NR3,30)
gen1 ANR3 = TNR3/30
gen1 b = –100*(ANQ3/ANP3)
genr at = NQ3–b*NP3
gen1 d = 0.30*(ANQ3/ANP3)
genr ct = NQ3–d*NP3
genr atct = at*ct
genr at2 = at**2
genr ct = ct**2
gen1 PA1 = d/(d–b)**2
gen1 PA12 = (PA1)**2
gen1 PA2 = b/(d–b)**2
gen1 PA22 = (PA2)**2
genr NPt3 = (at–ct)/(d–b)
genr NQt3 = (at*d–ct*b)/(d–b)
genr NPtQt3 = PA1*(at**2)+PA2*(ct**2) – ((PA1+PA2)*at*ct)
print b at d ct PA1 PA12 PA2 PA22 NPt3 NQt3 NPtQt3
```

Appendix 9.1: continued (VDM – PNG)

```
stat NPt3 NQt3 NPtQt3/pcov
stat at/mean=ea variance=va
stat ct/mean=ec variance=vc
gen1 ea2 = ea**2
genr da = at–ea
genr da3 = da**3
genr da4 = da**4
gen1 eda3 = da3/30
gen1 eda4 = da4/30
gen1 ec2 = ec**2
genr dc = ct–ec
genr dc3 = dc**3
genr dc4 = dc**4
gen1 edc3 = dc3/30
gen1 edc4 = dc4/30
stat at ct/cov=cac
matrix cac=(cac:1)'
gen1 cac=cac:2
print cac

******* Relationships in terms of Net Intercepts at & ct ********

gen1 vara2 = 4*ea2*va – va**2 + 4*ea*eda3 + eda4
gen1 varc2 = 4*ec2*vc – vc**2 + 4*ec*edc3 + edc4
gen1 varac = ec2*va + ea2*vc + 2*ea*ec*cac + ((da*dc–cac)/30)**2 + 2*ea*(da &
 *(dc**2))/30 + 2*ec*((da**2)*dc)/30
gen1 cova2c2 = 4*ea*ec*cac + ((da**2)*(dc**2))/30 + 2*ea*((dc**2)*da)/30 + &
 2*ec*((da**2)*dc)/30 – va*vc
gen1 cova2ac = 2*ea2*cac + 2*ea*ec*va + 3*ea*((da**2)*dc)/30 + ec*eda3 + &
(da3*dc)/30 – va*cac
gen1 covc2ac = 2*ec2*cac + 2*ec*ea*vc + 3*ec*((dc**2)*da)/30 + ea*edc3 + &
 (dc3*da)/30 – vc*cac
print vara2 varc2 varac cova2c2 cova2ac covc2ac

******* The Variance of Revenue (PtQt) *********

gen1 varPtQt3 = PA12*vara2 + PA22*varc2 + ((PA1+PA2)**2)*varac + 2*PA1*PA2 &
 *cova2c2 – 2*PA1*(PA1+PA2)*cova2ac – 2*PA2*(PA1+PA2)*covc2ac
print varPtQt3

******* Notice varPtQt3 = R3DE + R3SE + R3IE *********

gen1 d1 = va*((4*ea2)*PA12+((PA1+PA2)**2)*ec2–4*PA1*(PA1+PA2)*ea*ec) – &
 (va**2)*PA12
gen1 d2 = eda3*(4*ea*PA12) – 2*ec*PA1*(PA1+PA2)
gen1 d3 = eda4*PA12
gen1 R3DE = d1+d2+d3
print d1 d2 d3 R3DE
gen1 s1 = vc*((4*ec2)*PA12+((PA1+PA2)**2)*ea2–4*PA1*(PA1+PA2)*ec*ea) – &
 (vc**2)*PA12
gen1 s2 = edc3*(4*ec*PA12) – 2*ea*PA1*(PA1+PA2)
gen1 s3 = edc4*PA12
```

Appendix 9.1: continued (VDM – PNG)

```
gen1 R3SE = s1+s2+s3
print s1 s2 s3 R3SE
gen1 R3IE = varPtQt3–R3DE–R3SE
print R3IE

****** Revenue Decomposition Results ********

print R3DE R3SE R3IE

***** Revenue Decomposition Proportions *****

gen1 CERV3 = R3DE + R3SE + R3IE
gen1 R3DE = (R3DE/CERV3)*100
gen1 R3SE = (R3SE/CERV3)*100
gen1 R3IE = (R3IE/CERV3)*100
print CERV3 R3DE R3SE R3IE

****** Price Decomposition Results *********

gen1 varP3t = va/(d–b)**2 + vc/(d–b)**2 – (2*cac)/(d–b)**2
gen1 P3DE = va/(d–b)**2
gen1 P3SE = vc/(d–b)**2
gen1 P3IE = –(2*cac)/(d–b)**2
gen1 PIE = varP3t–P3DE–P3SE
print varP3t P3DE P3SE P3IE PIE

***** Price Decomposition Proportions *****

gen1 CEPV3 = P3DE + P3SE + P3IE
gen1 P3DE = (P3DE/CEPV3)*100
gen1 P3SE = (P3SE/CEPV3)*100
gen1 P3IE = (P3IE/CEPV3)*100
print CERPV3 P3DE P3SE P3IE

******* Quantity Decomposition Results *******

gen1 varQ3t = ((d**2)*va)/(d–b)**2 + ((b**2)*vc)/(d–b)**2 – (2*b*d*cac) &
/(d–b)**2
gen1 Q3DE = ((d**2)*va)/(d–b)**2
gen1 Q3SE = ((b**2)*vc)/(d–b)**2
gen1 Q3IE = –(2*b*d*cac)/(d–b)**2
gen1 QIE = varQ3t–Q3DE–Q3SE
print varQ3t Q3DE Q3SE Q3IE QIE

***** Quantity Decomposition Proportions *****

gen1 CEQV3 = Q3DE + Q3SE + Q3IE
gen1 Q3DE = (Q3DE/CEQV3)*100
gen1 Q3SE = (Q3SE/CEQV3)*100
gen1 Q3IE = (Q3IE/CEQV3)*100
print CEQV3 Q3DE Q3SE Q3IE
```

Appendix 9.1: continued (VDM – PNG)

******** **Copra/coconut oil** (1961–1990) *********

```
sample 1 30
gen1 TNP4 = sum(NP4,30)
gen1 ANP4 = TNP4/30
gen1 TNQ4 = sum(NQ4,30)
gen1 ANQ4 = TNQ4/30
genr NR4 = NP4*NQ4
gen1 TNR4 = sum(NR4,30)
gen1 ANR4 = TNR4/30
gen1 b = -100*(ANQ4/ANP4)
genr ct = NQ4-b*NP4
gen1 d = 0.15*(ANQ4/ANP4)
genr ct = NQ4-d*NP4
genr atct = at*ct
genr at2 = at**2
genr ct2 = ct**2
gen1 PA1 = d/(d-b)**2
gen1 PA12 = (PA1)**2
gen1 PA2 = b/(d-b)**2
gen1 PA22 = (PA2)**2
genr NPt4 = (at-ct)/(d-b)
genr NQt4 = (at*d-ct*b)/(d-b)
genr NPtQt4 = PA1*(at**2)+PA2*(ct**2) - ((PA1+PA2)*at*ct)
print b at d ct PA1 PA12 PA2 PA22 NPt4 NQt4 NPtQt4
stat NP4 NQ4 FR4/mean=m1 variance=v1 covariance=v2
stat NP4 NQ4 NR4/pcov
stat at/mean=ea variance=va
stat ct/mean=ec variance=vc
gen1 ea2 = ea**2
genr da = at-ea
genr da3 = da**3
genr da4 = da**4
gen1 eda3 = da3/30
gen1 eda4 = da4/30
gen1 ec2 = ec**2
genr dc = ct-ec
genr dc3 = dc**3
genr dc4 = dc**4
gen1 edc3 = dc3/30
gen1 edc4 = dc4/30
stat at ct/cov=cac
matrix cac=(cac:1)'
gen1 cac=cac:2
print cac
```

******** Relationships in terms of Intercepts at & ct *********

```
gen1 vara2 = 4*ea2*va - va**2 + 4*ea*eda3 + eda4
gen1 varc2 = 4*ec2*vc - vc**2 + 4*ec*edc3 + edc4
gen1 varac = ec2*va + ea2*vc + 2*ea*ec*cac + ((da*dc-cac)/30)**2 + 2*ea*(da &
 *(dc**2))/30 + 2*ec*((da**2)*dc)/30
```

Appendix 9.1: continued (VDM – PNG)

```
gen1 cova2c2 = 4*ea*ec*cac + ((da**2)*(dc**2))/30 + 2*ea*((dc**2)*da)/30 + &
 2*ec*((da**2)*dc)/30 – va*vc
gen1 cova2ac = 2*ea2*cac + 2*ea*ec*va + 3*ea*((da**2)*dc)/30 + ec*eda3 + &
 (da3*dc)/30 – va*cac
gen1 covc2ac = 2*ec2*cac + 2*ec*ea*vc + 3*ec*((dc**2)*da)/30 + ea*edc3 + &
 (dc3*da)/30 – vc*cac
print vara2 varc2 varac cova2c2 cova2ac covc2ac

******* The Variance of Revenue (PtQt) *********

gen1 varPtQt4 = PA12*vara2 + PA22*varc2 + ((PA1+PA2)**2)*varac + 2*PA1*PA2 &
 *cova2c2 – 2*PA1*(PA1+PA2)*cova2ac – 2*PA2*(PA1*PA2)*covc2ac
print varPtQt4

******* Notice varPtQt4 = R4DE + R4SE + R4IE *********

gen1 d1 = va*((4*ea2)*PA12+((PA1+PA2)**2)*ec2–4*PA1*(PA1+PA2)*ea*ec) – &
 (va**2)*PA12
gen1 d2 = eda3*(4*ea*PA12) – 2*ec*PA1*(PA1+PA2)
gen1 d3 = eda4*PA12
gen1 R4DE = d1+d2+d3
print d1 d2 d3 R4DE
gen1 s1 = vc*((4*ec2)*PA12+((PA1+PA2)**2)*ea2–4*PA1*(PA1+PA2)*ec*ea) – &
 (vc**2)*PA12
gen1 s2 = edc3*(4*ec*PA12) – 2*ea*PA1*(PA1+PA2)
gen1 s3 = edc4*PA12
gen1 R4SE = s1+s2+s3
print s1 s2 s3 R4SE
gen1 R4IE = varPtQt4–R4DE–R4SE
print R4IE

******* Revenue Decomposition Results *********

print R4DE R4SE R4IE

***** Revenue Decomposition Proportions *****

gen1 CERV4 = R4DE + R4SE + R4IE
gen1 R4DE = (R4DE/CERV4)*100
gen1 R4SE = (R4SE/CERV4)*100
gen1 R4IE = (R4IE/CERV4)*100
print CERV4 R4DE R4SE R4IE

******* Price Decomposition Results **********

gen1 varP4t = va/(d–b)**2 + vc/(d–b)**2 – (2*cac)/(d–b)**2
gen1 P4DE = va/(d–b)**2
gen1 P4SE = vc/(d–b)**2
gen1 P4IE = –(2*cac)/(d–b)**2
gen1 PIE = varP4t–P4DE–P4SE
print varP4t P4DE P4SE P4IE PIE
```

Appendix 9.1: continued (VDM – PNG)

```
***** Price Decomposition Proportions *****

gen1 CEPV4 = P4DE + P4SE + P4IE
gen1 P4DE = (P4DE/CEPV4)*100
gen1 P4SE = (P4SE/CEPV4)*100
gen1 P4IE = (P4IE/CEPV4)*100
print CERPV4 P4DE P4SE P4IE

******* Quantity Decomposition Results **********

gen1 varQ4t = ((d**2)*va)/(d–b)**2 + ((b**2)*vc)/(d–b)**2 – (2*b*d*cac) &
 /(d–b)**2
gen1 Q4DE = ((d**2)*va)/(d–b)**2
gen1 Q4SE = ((b**2)*vc)/(d–b)**2
gen1 Q4IE = –(2*b*d*cac)/(d–b)**2
gen1 QIE = varQ4t–Q4DE–Q4SE
print varQ4t Q4DE Q4SE Q4IE QIE

***** Quantity Decomposition Proportions *****

gen1 CEQV4 = Q4DE + Q4SE + Q4IE
gen1 Q4DE = (Q4DE/CEQV4)*100
gen1 Q4SE = (Q4SE/CEQV4)*100
gen1 Q4IE = (Q4IE/CEQV4)*100
print CEQV4 Q4DE Q4SE Q4IE


********* Rubber (1961–1990) *********

sample 1 30
gen1 TNP5 = sum(NP5,30)
gen1 ANP5 = TNP5/30
gen1 TNQ5 = sum(NQ5,30)
gen1 ANQ5 = TNQ5/30
genr NR5 = NP5*NQ5
gen1 TNR5 = sum(NR5,30)
gen1 ANR5 = TNR5/30
gen1 b = –90*(ANQ5/ANP5)
genr ct = NQ5–b*NP5
gen1 d = 0.15*(ANQ5/ANP5)
genr ct = NQ5–d*NP5
genr atct = at*ct
genr at2 = at**2
genr ct2 = ct**2
gen1 PA1 = d/(d–b)**2
gen1 PA12 = (PA1)**2
gen1 PA2 = b/(d–b)**2
gen1 PA22 = (PA2)**2
genr NPt5 = (at–ct)/(d–b)
genr NQt5 = (at*d–ct*b)/(d–b)
genr NPtQt5 = PA1*(at**2)+PA2*(ct**2) – ((PA1+PA2)*at*ct)
print b at d ct PA1 PA12 PA2 PA22 NPt5 NQt5 NPtQt5
```

Appendix 9.1: continued (VDM – PNG)

```
stat NP5 NQ5 NR5/mean=m1 variance=v1 covariance=v2
stat NP5 NQ5 NR5/pcov
stat at/mean=ea variance=va
stat ct/mean=ec variance=vc
gen1 ea2 = ea**2
genr da = at–ea
genr da3 = da**3
genr da4 = da**4
gen1 eda3 = da3/30
gen1 eda4 = da4/30
gen1 ec2 = ec**2
genr dc = ct–ec
genr dc3 = dc**3
genr dc4 = dc**4
gen1 edc3 = dc3/30
gen1 edc4 = dc4/30
stat at ct/cov=cac
matrix cac=(cac:1)'
gen1 cac=cac:2
print cac

******** Relationships in terms of Intercepts at & ct *********

gen1 vara2 = 4*ea2*va – va**2 + 4*ea*eda3 + eda4
gen1 varc2 = 4*ec2*vc – vc**2 + 4*ec*edc3 + edc4
gen1 varac = ec2*va + ea2*vc + 2*ea*ec*cac + ((da*dc–cac)/30)**2 + 2*ea*(da &
 *(dc**2))/30 + 2*ec*((da**2)*dc)/30
gen1 cova2c2 = 4*ea*ec*cac + ((da**2)*(dc**2))/30 + 2*ea*((dc**2)*da)/30 + &
 2*ec*((da**2)*dc)/30 – va*vc
gen1 cova2ac = 2*ea2*cac + 2*ea*ec*va + 3*ea*((da**2)*dc)/30 + ec*eda3 + &
 (da3*dc)/30 – va*cac
gen1 covc2ac = 2*ec2*cac + 2*ec*ea*vc + 3*ec*((dc**2)*da)/30 + ea*edc3 + &
 (dc3*da)/30 – vc*cac
print vara2 varc2 varac cova2c2 cova2ac covc2ac

******* The Variance of Revenue (PtQt) *********

gen1 varPtQt5 = PA12*vara2 + PA22*varc2 + ((PA1+PA2)**2)*varac + 2*PA1*PA2 &
 *cova2c2 – 2*PA1*(PA1+PA2)*cova2ac – 2*PA2*(PA1*PA2)*covc2ac
print varPtQt5

******* Notice varPtQt5 = R5DE + R5SE + R5IE *********

gen1 d1 = va*((4*ea2)*PA12+((PA1+PA2)**2)*ec2–4*PA1*(PA1+PA2)*ea*ec) – &
 (va**2)*PA12
gen1 d2 = eda3*(4*ea*PA12) – 2*ec*PA1*(PA1+PA2)
gen1 d3 = eda4*PA12
gen1 R5DE = d1+d2+d3
print d1 d2 d3 R5DE
gen1 s1 = vc*((4*ec2)*PA12+((PA1+PA2)**2)*ea2–4*PA1*(PA1+PA2)*ec*ea) – &
 (vc**2)*PA12
gen1 s2 = edc3*(4*ec*PA12) – 2*ea*PA1*(PA1+PA2)
```

Appendix 9.1: continued (VDM – PNG)

```
gen1 s3 = edc4*PA12
gen1 R5SE = s1+s2+s3
print s1 s2 s3 R5SE
gen1 R5IE = varPtQt5–R5DE–R5SE
print R5IE

******* Revenue Decomposition Results *********

print R5DE R5SE R5IE

***** Revenue Decomposition Proportions *****

gen1 CERV5 = R5DE + R5SE + R5IE
gen1 R5DE = (R5DE/CERV5)*100
gen1 R5SE = (R5SE/CERV5)*100
gen1 R5IE = (R5IE/CERV5)*100
print CERV5 R5DE R5SE R5IE

******* Price Decomposition Results ***********

gen1 varP5t = va/(d–b)**2 + vc/(d–b)**2 – (2*cac)/(d–b)**2
gen1 P5DE = va/(d–b)**2
gen1 P5SE = vc/(d–b)**2
gen1 P5IE = –(2*cac)/(d–b)**2
gen1 PIE = varP5t–P5DE–P5SE
print varP5t P5DE P5SE P5IE PIE

***** Price Decomposition Proportions *****

gen1 CEPV5 = P5DE + P5SE + P5IE
gen1 P5DE = (P5DE/CEPV5)*100
gen1 P5SE = (P5SE/CEPV5)*100
gen1 P5IE = (P5IE/CEPV5)*100
print CERPV5 P5DE P5SE P5IE

******* Quantity Decomposition Results **********

gen1 varQ5t = ((d**2)*va)/(d–b)**2 + ((b**2)*vc)/(d–b)**2 – (2*b*d*cac) &
/(d–b)**2
gen1 Q5DE = ((d**2)*va)/(d–b)**2
gen1 Q5SE = ((b**2)*vc)/(d–b)**2
gen1 Q5IE = –(2*b*d*cac)/(d–b)**2
gen1 QIE = varQ5t–Q5DE–Q5SE
print varQ5t Q5DE Q5SE Q5IE QIE

***** Quantity Decomposition Proportions *****

gen1 CEQV5 = Q5DE + Q5SE + Q5IE
gen1 Q5DE = (Q5DE/CEQV5)*100
gen1 Q5SE = (Q5SE/CEQV5)*100
gen1 Q5IE = (Q5IE/CEQV5)*100
print CEQV5 Q5DE Q5SE Q5IE
```

Appendix 9.1: continued (VDM – PNG)

********* **Logs** (1961–1990) *********

```
sample 1 30
gen1 TNP6 = sum(NP6,30)
gen1 ANP6 = TNP6/30
gen1 TNQ6 = sum(NQ6,30)
gen1 ANQ6 = TNQ6/30
genr NR6 = NP6*NQ6
gen1 TNR6 = sum(NR6,30)
gen1 ANR6 = TNR6/30
gen1 b = –90*(ANQ6/ANP6)
genr ct = NQ6–b*NP6
gen1 d = 0.01*(ANQ6/ANP6)
genr ct = NQ6–d*NP6
genr atct = at*ct
genr at2 = at**2
genr ct2 = ct**2
gen1 PA1 = d/(d–b)**2
gen1 PA12 = (PA1)**2
gen1 PA2 = b/(d–b)**2
gen1 PA22 = (PA2)**2
genr NPt6 = (at–ct)/(d–b)
genr NQt6 = (at*d–ct*b)/(d–b)
genr NPtQt6 = PA1*(at**2)+PA2*(ct**2) – ((PA1+PA2)*at*ct)
print b at d ct PA1 PA12 PA2 PA22 NPt6 NQt6 NPtQt6
stat NP6 NQ6 NR6/mean=m1 variance=v1 covariance=v2
stat NP6 NQ6 NR6/pcov
stat at/mean=ea variance=va
stat ct/mean=ec variance=vc
gen1 ea2 = ea**2
genr da = at–ea
genr da3 = da**3
genr da4 = da**4
gen1 eda3 = da3/30
gen1 eda4 = da4/30
gen1 ec2 = ec**2
genr dc = ct–ec
genr dc3 = dc**3
genr dc4 = dc**4
gen1 edc3 = dc3/30
gen1 edc4 = dc4/30
stat at ct/cov=cac
matrix cac=(cac:1)'
gen1 cac=cac:2
print cac
```

Appendix 9.1: continued (VDM – PNG)

```
******** Relationships in terms of Intercepts at & ct *********

gen1 vara2 = 4*ea2*va – va**2 + 4*ea*eda3 + eda4
gen1 varc2 = 4*ec2*vc – vc**2 + 4*ec*edc3 + edc4
gen1 varac = ec2*va + ea2*vc + 2*ea*ec*cac + ((da*dc–cac)/30)**2 + 2*ea*(da &
 *(dc**2))/30 + 2*ec*((da**2)*dc)/30
gen1 cova2c2 = 4*ea*ec*cac + ((da**2)*(dc**2))/30 + 2*ea*((dc**2)*da)/30 + &
 2*ec*((da**2)*dc)/30 – va*vc
gen1 cova2ac = 2*ea2*cac + 2*ea*ec*va + 3*ea*((da**2)*dc)/30 + ec*eda3 + &
 (da3*dc)/30 – va*cac
gen1 covc2ac = 2*ec2*cac + 2*ec*ea*vc + 3*ec*((dc**2)*da)/30 + ea*edc3 + &
 (dc3*da)/30 – vc*cac
print vara2 varc2 varac cova2c2 cova2ac covc2ac

******* The Variance of Revenue (PtQt) *********

gen1 varPtQt6 = PA12*vara2 + PA22*varc2 + ((PA1+PA2)**2)*varac + 2*PA1*PA2 &
 *cova2c2 – 2*PA1*(PA1+PA2)*cova2ac – 2*PA2*(PA1*PA2)*covc2ac
print varPtQt6

******* Notice varPtQt6 = R6DE + R6SE + R6IE *********

gen1 d1 = va*((4*ea2)*PA12+((PA1+PA2)**2)*ec2–4*PA1*(PA1+PA2)*ea*ec) – &
 (va**2)*PA12
gen1 d2 = eda3*(4*ea*PA12) – 2*ec*PA1*(PA1+PA2)
gen1 d3 = eda4*PA12
gen1 R6DE = d1+d2+d3
print d1 d2 d3 R6DE
gen1 s1 = vc*((4*ec2)*PA12+((PA1+PA2)**2)*ea2–4*PA1*(PA1+PA2)*ec*ea) – &
 (vc**2)*PA12
gen1 s2 = edc3*(4*ec*PA12) – 2*ea*PA1*(PA1+PA2)
gen1 s3 = edc4*PA12
gen1 R6SE = s1+s2+s3
print s1 s2 s3 R6SE
gen1 R6IE = varPtQt6–R6DE–R6SE
print R6IE

******* Revenue Decomposition Results *********

print R6DE R6SE R6IE

***** Revenue Decomposition Proportions *****

gen1 CERV6 = R6DE + R6SE + R6IE
gen1 R6DE = (R6DE/CERV6)*100
gen1 R6SE = (R6SE/CERV6)*100
gen1 R6IE = (R6IE/CERV6)*100
print CERV6 R6DE R6SE R6IE
```

Appendix 9.1: continued (VDM – PNG)

******* Price Decomposition Results **********

```
gen1 varP6t = va/(d–b)**2 + vc/(d–b)**2 – (2*cac)/(d–b)**2
gen1 P6DE = va/(d–b)**2
gen1 P6SE = vc/(d–b)**2
gen1 P6IE = –(2*cac)/(d–b)**2
gen1 PIE = varP6t–P6DE–P6SE
print varP6t P6DE P6SE P6IE PIE
```

***** Price Decomposition Proportions *****

```
gen1 CEPV6 = P6DE + P6SE + P6IE
gen1 P6DE = (P6DE/CEPV6)*100
gen1 P6SE = (P6SE/CEPV6)*100
gen1 P6IE = (P6IE/CEPV6)*100
print CERPV6 P6DE P6SE P6IE
```

******* Quantity Decomposition Results **********

```
gen1 varQ6t = ((d**2)*va)/(d–b)**2 + ((b**2)*vc)/(d–b)**2 – (2*b*d*cac) &
 /(d–b)**2
gen1 Q6DE = ((d**2)*va)/(d–b)**2
gen1 Q6SE = ((b**2)*vc)/(d–b)**2
gen1 Q6IE = –(2*b*d*cac)/(d–b)**2
gen1 QIE = varQ6t–Q6DE–Q6SE
print varQ6t Q6DE Q6SE Q6IE QIE
```

***** Quantity Decomposition Proportions *****

```
gen1 CEQV6 = Q6DE + Q6SE + Q6IE
gen1 Q6DE = (Q6DE/CEQV6)*100
gen1 Q6SE = (Q6SE/CEQV6)*100
gen1 Q6IE = (Q6IE/CEQV6)*100
print CEQV6 Q6DE Q6SE Q6IE
```

********* **Forestry** (1961–1990) *********

```
sample 1 30
gen1 TNP7 = sum(NP7,30)
gen1 ANP7 = TNP7/30
gen1 TNQ7 = sum(NQ7,30)
gen1 ANQ7 = TNQ7/30
genr NR7 = NP7*NQ7
gen1 TNR7 = sum(NR7,30)
gen1 ANR7 = TNR7/30
gen1 b = –90*(ANQ7/ANP7)
genr ct = NQ7–b*NP7
gen1 d = 0.01*(ANQ7/ANP7)
genr ct = NQ7–d*NP7
genr atct = at*ct
genr at2 = at**2
```

Appendix 9.1: continued (VDM – PNG)

```
genr ct2 = ct**2
gen1 PA1 = d/(d–b)**2
gen1 PA12 = (PA1)**2
gen1 PA2 = b/(d–b)**2
gen1 PA22 = (PA2)**2
genr NPt7 = (at–ct)/(d–b)
genr NQt7 = (at*d–ct*b)/(d–b)
genr NPtQt7 = PA1*(at**2)+PA2*(ct**2) – ((PA1+PA2)*at*ct)
print b at d ct PA1 PA12 PA2 PA22 NPt7 NQt7 NPtQt7
stat NP7 NQ7 NR7/mean=m1 variance=v1 covariance=v2
stat NP7 NQ7 NR7/pcov
stat at/mean=ea variance=va
stat ct/mean=ec variance=vc
gen1 ea2 = ea**2
genr da = at–ea
genr da3 = da**3
genr da4 = da**4
gen1 eda3 = da3/30
gen1 eda4 = da4/30
gen1 ec2 = ec**2
genr dc = ct–ec
genr dc3 = dc**3
genr dc4 = dc**4
gen1 edc3 = dc3/30
gen1 edc4 = dc4/30
stat at ct/cov=cac
matrix cac=(cac:1)'
gen1 cac=cac:2
print cac

******** Relationships in terms of Intercepts at & ct *********

gen1 vara2 = 4*ea2*va – va**2 + 4*ea*eda3 + eda4
gen1 varc2 = 4*ec2*vc – vc**2 + 4*ec*edc3 + edc4
gen1 varac = ec2*va + ea2*vc + 2*ea*ec*cac + ((da*dc–cac)/30)**2 + 2*ea*(da &
 *(dc**2))/30 + 2*ec*((da**2)*dc)/30
gen1 cova2c2 = 4*ea*ec*cac + ((da**2)*(dc**2))/30 + 2*ea*((dc**2)*da)/30 + &
 2*ec*((da**2)*dc)/30 – va*vc
gen1 cova2ac = 2*ea2*cac + 2*ea*ec*va + 3*ea*((da**2)*dc)/30 + ec*eda3 + &
 (da3*dc)/30 – va*cac
gen1 covc2ac = 2*ec2*cac + 2*ec*ea*vc + 3*ec*((dc**2)*da)/30 + ea*edc3 + &
 (dc3*da)/30 – vc*cac
print vara2 varc2 varac cova2c2 cova2ac covc2ac

******* The Variance of Revenue (PtQt) *********

gen1 varPtQt7 = PA12*vara2 + PA22*varc2 + ((PA1+PA2)**2)*varac + 2*PA1*PA2 &
 *cova2c2 – 2*PA1*(PA1+PA2)*cova2ac – 2*PA2*(PA1*PA2)*covc2ac
print varPtQt7
```

Appendix 9.1: continued (VDM – PNG)

```
******* Notice varPtQt7 = R7DE + R7SE + R7IE *********

gen1 d1 = va*((4*ea2)*PA12+((PA1+PA2)**2)*ec2–4*PA1*(PA1+PA2)*ea*ec) – &
 (va**2)*PA12
gen1 d2 = eda3*(4*ea*PA12) – 2*ec*PA1*(PA1+PA2)
gen1 d3 = eda4*PA12
gen1 R7DE = d1+d2+d3
print d1 d2 d3 R7DE
gen1 s1 = vc*((4*ec2)*PA12+((PA1+PA2)**2)*ea2–4*PA1*(PA1+PA2)*ec*ea) – &
 (vc**2)*PA12
gen1 s2 = edc3*(4*ec*PA12) – 2*ea*PA1*(PA1+PA2)
gen1 s3 = edc4*PA12
gen1 R7SE = s1+s2+s3
print s1 s2 s3 R7SE
gen1 R7IE = varPtQt7–R7DE–R7SE
print R7IE

******* Revenue Decomposition Results *********

print R7DE R7SE R7IE

***** Revenue Decomposition Proportions *****

gen1 CERV7 = R7DE + R7SE + R7IE
gen1 R7DE = (R7DE/CERV7)*100
gen1 R7SE = (R7SE/CERV7)*100
gen1 R7IE = (R7IE/CERV7)*100
print CERV7 R7DE R7SE R7IE

******* Price Decomposition Results ***********

gen1 varP7t = va/(d–b)**2 + vc/(d–b)**2 – (2*cac)/(d–b)**2
gen1 P7DE = va/(d–b)**2
gen1 P7SE = vc/(d–b)**2
gen1 P7IE = –(2*cac)/(d–b)**2
gen1 PIE = varP7t–P7DE–P7SE
print varP7t P7DE P7SE P7IE PIE

***** Price Decomposition Proportions *****

gen1 CEPV7 = P7DE + P7SE + P7IE
gen1 P7DE = (P7DE/CEPV7)*100
gen1 P7SE = (P7SE/CEPV7)*100
gen1 P7IE = (P7IE/CEPV7)*100
print CERPV7 P7DE P7SE P7IE

******* Quantity Decomposition Results **********

gen1 varQ7t = ((d**2)*va)/(d–b)**2 + ((b**2)*vc)/(d–b)**2 – (2*b*d*cac) &
 /(d–b)**2
gen1 Q7DE = ((d**2)*va)/(d–b)**2
gen1 Q7SE = ((b**2)*vc)/(d–b)**2
```

Appendix 9.1: continued (VDM – PNG)

```
gen1 Q7IE = –(2*b*d*cac)/(d–b)**2
gen1 QIE = varQ7t–Q7DE–Q7SE
print varQ7t Q7DE Q7SE Q7IE QIE

***** Quantity Decomposition Proportions *****

gen1 CEQV7 = Q7DE + Q7SE + Q7IE
gen1 Q7DE = (Q7DE/CEQV7)*100
gen1 Q7SE = (Q7SE/CEQV7)*100
gen1 Q7IE = (Q7IE/CEQV7)*100
print CEQV7 Q7DE Q7SE Q7IE


********* Marine (1961–1990) *********

sample 1 30
gen1 TNP8 = sum(NP8,30)
gen1 ANP8 = TNP8/30
gen1 TNQ8 = sum(NQ8,30)
gen1 ANQ8 = TNQ8/30
genr NR8 = NP8*NQ8
gen1 TNR8 = sum(NR8,30)
gen1 ANR8 = TNR8/30
gen1 b = –95*(ANQ8/ANP8)
genr ct = NQ8–b*NP8
gen1 d = 0.05*(ANQ8/ANP8)
genr ct = NQ8–d*NP8
genr atct = at*ct
genr at2 = at**2
genr ct2 = ct**2
gen1 PA1 = d/(d–b)**2
gen1 PA12 = (PA1)**2
gen1 PA2 = b/(d–b)**2
gen1 PA22 = (PA2)**2
genr NPt8 = (at–ct)/(d–b)
genr NQt8 = (at*d–ct*b)/(d–b)
genr NPtQt8 = PA1*(at**2)+PA2*(ct**2) – ((PA1+PA2)*at*ct)
print b at d ct PA1 PA12 PA2 PA22 NPt8 NQt8 NPtQt8
stat NP8 NQ8 NR8/mean=m1 variance=v1 covariance=v2
stat NP8 NQ8 NR8/pcov
stat at/mean=ea variance=va
stat ct/mean=ec variance=vc
gen1 ea2 = ea**2
genr da = at–ea
genr da3 = da**3
genr da4 = da**4
gen1 eda3 = da3/30
gen1 eda4 = da4/30
gen1 ec2 = ec**2
genr dc = ct–ec
genr dc3 = dc**3
genr dc4 = dc**4
```

Appendix 9.1: continued (VDM – PNG)

```
gen1 edc3 = dc3/30
gen1 edc4 = dc4/30
stat at ct/cov=cac
matrix cac=(cac:1)'
gen1 cac=cac:2
print cac

******** Relationships in terms of Intercepts at & ct *********

gen1 vara2 = 4*ea2*va – va**2 + 4*ea*eda3 + eda4
gen1 varc2 = 4*ec2*vc – vc**2 + 4*ec*edc3 + edc4
gen1 varac = ec2*va + ea2*vc + 2*ea*ec*cac + ((da*dc–cac)/30)**2 + 2*ea*(da &
 *(dc**2))/30 + 2*ec*((da**2)*dc)/30
gen1 cova2c2 = 4*ea*ec*cac + ((da**2)*(dc**2))/30 + 2*ea*((dc**2)*da)/30 + &
 2*ec*((da**2)*dc)/30 – va*vc
gen1 cova2ac = 2*ea2*cac + 2*ea*ec*va + 3*ea*((da**2)*dc)/30 + ec*eda3 + &
 (da3*dc)/30 – va*cac
gen1 covc2ac = 2*ec2*cac + 2*ec*ea*vc + 3*ec*((dc**2)*da)/30 + ea*edc3 + &
 (dc3*da)/30 – vc*cac
print vara2 varc2 varac cova2c2 cova2ac covc2ac

******* The Variance of Revenue (PtQt) *********

gen1 varPtQt8 = PA12*vara2 + PA22*varc2 + ((PA1+PA2)**2)*varac + 2*PA1*PA2 &
 *cova2c2 – 2*PA1*(PA1+PA2)*cova2ac – 2*PA2*(PA1*PA2)*covc2ac
print varPtQt8

******* Notice varPtQt8 = R8DE + R8SE + R8IE *********

gen1 d1 = va*((4*ea2)*PA12+((PA1+PA2)**2)*ec2–4*PA1*(PA1+PA2)*ea*ec) – &
 (va**2)*PA12
gen1 d2 = eda3*(4*ea*PA12) – 2*ec*PA1*(PA1+PA2)
gen1 d3 = eda4*PA12
gen1 R8DE = d1+d2+d3
print d1 d2 d3 R8DE
gen1 s1 = vc*((4*ec2)*PA12+((PA1+PA2)**2)*ea2–4*PA1*(PA1+PA2)*ec*ea) – &
 (vc**2)*PA12
gen1 s2 = edc3*(4*ec*PA12) – 2*ea*PA1*(PA1+PA2)
gen1 s3 = edc4*PA12
gen1 R8SE = s1+s2+s3
print s1 s2 s3 R8SE
gen1 R8IE = varPtQt8–R8DE–R8SE
print R8IE

******* Revenue Decomposition Results *********

print R8DE R8SE R8IE
```

Appendix 9.1: continued (VDM – PNG)

```
***** Revenue Decomposition Proportions *****

gen1 CERV8 = R8DE + R8SE + R8IE
gen1 R8DE = (R8DE/CERV8)*100
gen1 R8SE = (R8SE/CERV8)*100
gen1 R8IE = (R8IE/CERV8)*100
print CERV8 R8DE R8SE R8IE

******* Price Decomposition Results **********

gen1 varP8t = va/(d–b)**2 + vc/(d–b)**2 – (2*cac)/(d–b)**2
gen1 P8DE = va/(d–b)**2
gen1 P8SE = vc/(d–b)**2
gen1 P8IE = –(2*cac)/(d–b)**2
gen1 PIE = varP8t–P8DE–P8SE
print varP8t P8DE P8SE P8IE PIE

***** Price Decomposition Proportions *****

gen1 CEPV8 = P8DE + P8SE + P8IE
gen1 P8DE = (P8DE/CEPV8)*100
gen1 P8SE = (P8SE/CEPV8)*100
gen1 P8IE = (P8IE/CEPV8)*100
print CERPV8 P8DE P8SE P8IE

******* Quantity Decomposition Results **********

gen1 varQ8t = ((d**2)*va)/(d–b)**2 + ((b**2)*vc)/(d–b)**2 – (2*b*d*cac) &
 /(d–b)**2
gen1 Q8DE = ((d**2)*va)/(d–b)**2
gen1 Q8SE = ((b**2)*vc)/(d–b)**2
gen1 Q8IE = –(2*b*d*cac)/(d–b)**2
gen1 QIE = varQ8t–Q8DE–Q8SE
print varQ8t Q8DE Q8SE Q8IE QIE

***** Quantity Decomposition Proportions *****

gen1 CEQV8 = Q8DE + Q8SE + Q8IE
gen1 Q8DE = (Q8DE/CEQV8)*100
gen1 Q8SE = (Q8SE/CEQV8)*100
gen1 Q8IE = (Q8IE/CEQV8)*100
print CEQV8 Q8DE Q8SE Q8IE
```

Appendix 9.1: continued (VDM – PNG)

********* **Tea** (1961–1990) *********

```
sample 1 30
genl TNP9 = sum(NP9,30)
genl ANP9 = TNP9/28
genl TNQ9 = sum(NQ9,30)
genl ANQ9 = TNQ9/28
genr NR9 = NP9*NQ9
genl TNR9 = sum(NR9,30)
genl ANR9 = TNR9/28
genl b = –100*(ANQ9/ANP9)
genr ct = NQ9–b*NP9
genl d = 0.05*(ANQ9/ANP9)
genr ct = NQ9–d*NP9
genr atct = at*ct
genr at2 = at**2
genr ct2 = ct**2
genl PA1 = d/(d–b)**2
genl PA12 = (PA1)**2
genl PA2 = b/(d–b)**2
genl PA22 = (PA2)**2
genr NPt9 = (at–ct)/(d–b)
genr NQt9 = (at*d–ct*b)/(d–b)
genr NPtQt9 = PA1*(at**2)+PA2*(ct**2) – ((PA1+PA2)*at*ct)
print b at d ct PA1 PA12 PA2 PA22 NPt9 NQt9 NPtQt9
stat NP9 NQ9 NR9/mean=m1 variance=v1 covariance=v2
stat NP9 NQ9 NR9/pcov
stat at/mean=ea variance=va
stat ct/mean=ec variance=vc
genl ea2 = ea**2
genr da = at–ea
genr da3 = da**3
genr da4 = da**4
genl eda3 = da3/28
genl eda4 = da4/28
genl ec2 = ec**2
genr dc = ct–ec
genr dc3 = dc**3
genr dc4 = dc**4
genl edc3 = dc3/28
genl edc4 = dc4/28
stat at ct/cov=cac
matrix cac=(cac:1)'
genl cac=cac:2
print cac
```

******** Relationships in terms of Intercepts at & ct *********

```
genl vara2 = 4*ea2*va – va**2 + 4*ea*eda3 + eda4
genl varc2 = 4*ec2*vc – vc**2 + 4*ec*edc3 + edc4
genl varac = ec2*va + ea2*vc + 2*ea*ec*cac + ((da*dc–cac)/28)**2 + 2*ea*(da &
 *(dc**2))/28 + 2*ec*((da**2)*dc)/28
```

Appendix 9.1: continued (VDM – PNG)

```
gen1 cova2c2 = 4*ea*ec*cac + ((da**2)*(dc**2))/28 + 2*ea*((dc**2)*da)/28 + &
 2*ec*((da**2)*dc)/28 – va*vc
gen1 cova2ac = 2*ea2*cac + 2*ea*ec*va + 3*ea*((da**2)*dc)/28 + ec*eda3 + &
 (da3*dc)/28 – va*cac
gen1 covc2ac = 2*ec2*cac + 2*ec*ea*vc + 3*ec*((dc**2)*da)/28 + ea*edc3 + &
 (dc3*da)/28 – vc*cac
print vara2 varc2 varac cova2c2 cova2ac covc2ac

******* The Variance of Revenue (PtQt) *********

gen1 varPtQt9 = PA12*vara2 + PA22*varc2 + ((PA1+PA2)**2)*varac + 2*PA1*PA2 &
 *cova2c2 – 2*PA1*(PA1+PA2)*cova2ac – 2*PA2*(PA1*PA2)*covc2ac
print varPtQt9

******* Notice varPtQt9 = R9DE + R9SE + R9IE *********

gen1 d1 = va*((4*ea2)*PA12+((PA1+PA2)**2)*ec2–4*PA1*(PA1+PA2)*ea*ec) – &
 (va**2)*PA12
gen1 d2 = eda3*(4*ea*PA12) – 2*ec*PA1*(PA1+PA2)
gen1 d3 = eda4*PA12
gen1 R9DE = d1+d2+d3
print d1 d2 d3 R9DE
gen1 s1 = vc*((4*ec2)*PA12+((PA1+PA2)**2)*ea2–4*PA1*(PA1+PA2)*ec*ea) – &
 (vc**2)*PA12
gen1 s2 = edc3*(4*ec*PA12) – 2*ea*PA1*(PA1+PA2)
gen1 s3 = edc4*PA12
gen1 R9SE = s1+s2+s3
print s1 s2 s3 R9SE
gen1 R9IE = varPtQt9–R9DE–R9SE
print R9IE

******* Revenue Decomposition Results *********

print R9DE R9SE R9IE

***** Revenue Decomposition Proportions *****

gen1 CERV9 = R9DE + R9SE + R9IE
gen1 R9DE = (R9DE/CERV9)*100
gen1 R9SE = (R9SE/CERV9)*100
gen1 R9IE = (R9IE/CERV9)*100
print CERV9 R9DE R9SE R9IE

******* Price Decomposition Results **********

gen1 varP9t = va/(d–b)**2 + vc/(d–b)**2 – (2*cac)/(d–b)**2
gen1 P9DE = va/(d–b)**2
gen1 P9SE = vc/(d–b)**2
gen1 P9IE = –(2*cac)/(d–b)**2
gen1 PIE = varP9t–P9DE–P9SE
print varP9t P9DE P9SE P9IE PIE
```

Appendix 9.1: continued (VDM – PNG)

```
***** Price Decomposition Proportions *****

gen1 CEPV9 = P9DE + P9SE + P9IE
gen1 P9DE = (P9DE/CEPV9)*100
gen1 P9SE = (P9SE/CEPV9)*100
gen1 P9IE = (P9IE/CEPV9)*100
print CERPV9 P9DE P9SE P9IE

******* Quantity Decomposition Results **********

gen1 varQ9t = ((d**2)*va)/(d–b)**2 + ((b**2)*vc)/(d–b)**2 – (2*b*d*cac) &
/(d–b)**2
gen1 Q9DE = ((d**2)*va)/(d–b)**2
gen1 Q9SE = ((b**2)*vc)/(d–b)**2
gen1 Q9IE = –(2*b*d*cac)/(d–b)**2
gen1 QIE = varQ9t–Q9DE–Q9SE
print varQ9t Q9DE Q9SE Q9IE QIE

***** Quantity Decomposition Proportions *****

gen1 CEQV9 = Q9DE + Q9SE + Q9IE
gen1 Q9DE = (Q9DE/CEQV9)*100
gen1 Q9SE = (Q9SE/CEQV9)*100
gen1 Q9IE = (Q9IE/CEQV9)*100
print CEQV9 Q9DE Q9SE Q9IE


********* Palm Oil (1961–1990) *********

sample 1 30
gen1 TNP10 = sum(NP10,30)
gen1 ANP10 = TNP10/20
gen1 TNQ10 = sum(NQ10,30)
gen1 ANQ10 = TNQ10/20
genr NR10 = NP10*NQ10
gen1 TNR10 = sum(NR10,30)
gen1 ANR10 = TNR10/20
gen1 b = –100*(ANQ10/ANP10)
genr ct = NQ10–b*NP10
gen1 d = 0.10*(ANQ10/ANP10)
genr ct = NQ10–d*NP10
genr atct = at*ct
genr at2 = at**2
genr ct2 = ct**2
gen1 PA1 = d/(d–b)**2
gen1 PA12 = (PA1)**2
gen1 PA2 = b/(d–b)**2
gen1 PA22 = (PA2)**2
genr NPt10 = (at–ct)/(d–b)
genr NQt10 = (at*d–ct*b)/(d–b)
genr NPtQt10 = PA1*(at**2)+PA2*(ct**2) – ((PA1+PA2)*at*ct)
print b at d ct PA1 PA12 PA2 PA22 NPt10 NQt10 NPtQt10
```

Appendix 9.1: continued (VDM – PNG)

```
stat NP10 NQ10 NR10/mean=m1 variance=v1 covariance=v2
stat NP10 NQ10 NR10/pcov
stat at/mean=ea variance=va
stat ct/mean=ec variance=vc
genl ea2 = ea**2
genr da = at–ea
genr da3 = da**3
genr da4 = da**4
genl eda3 = da3/20
genl eda4 = da4/20
genl ec2 = ec**2
genr dc = ct–ec
genr dc3 = dc**3
genr dc4 = dc**4
genl edc3 = dc3/20
genl edc4 = dc4/20
stat at ct/cov=cac
matrix cac=(cac:1)'
genl cac=cac:2
print cac

******** Relationships in terms of Intercepts at & ct *********

genl vara2 = 4*ea2*va – va**2 + 4*ea*eda3 + eda4
genl varc2 = 4*ec2*vc – vc**2 + 4*ec*edc3 + edc4
genl varac = ec2*va + ea2*vc + 2*ea*ec*cac + ((da*dc–cac)/20)**2 + 2*ea*(da &
 *(dc**2))/20 + 2*ec*((da**2)*dc)/20
genl cova2c2 = 4*ea*ec*cac + ((da**2)*(dc**2))/20 + 2*ea*((dc**2)*da)/20 + &
 2*ec*((da**2)*dc)/20 – va*vc
genl cova2ac = 2*ea2*cac + 2*ea*ec*va + 3*ea*((da**2)*dc)/20 + ec*eda3 + &
 (da3*dc)/20 – va*cac
genl covc2ac = 2*ec2*cac + 2*ec*ea*vc + 3*ec*((dc**2)*da)/20 + ea*edc3 + &
 (dc3*da)/20 – vc*cac
print vara2 varc2 varac cova2c2 cova2ac covc2ac

******* The Variance of Revenue (PtQt) *********

genl varPtQt10 = PA12*vara2 + PA22*varc2 + ((PA1+PA2)**2)*varac + 2*PA1*PA2 &
 *cova2c2 – 2*PA1*(PA1+PA2)*cova2ac – 2*PA2*(PA1*PA2)*covc2ac
print varPtQt10

******* Notice varPtQt10 = R10DE + R10SE + R10IE *********

genl d1 = va*((4*ea2)*PA12+((PA1+PA2)**2)*ec2–4*PA1*(PA1+PA2)*ea*ec) – &
 (va**2)*PA12
genl d2 = eda3*(4*ea*PA12) – 2*ec*PA1*(PA1+PA2)
genl d3 = eda4*PA12
genl R10DE = d1+d2+d3
print d1 d2 d3 R10DE
genl s1 = vc*((4*ec2)*PA12+((PA1+PA2)**2)*ea2–4*PA1*(PA1+PA2)*ec*ea) – &
 (vc**2)*PA12
genl s2 = edc3*(4*ec*PA12) – 2*ea*PA1*(PA1+PA2)
```

Appendix 9.1: continued (VDM – PNG)

```
gen1 s3 = edc4*PA12
gen1 R10SE = s1+s2+s3
print s1 s2 s3 R10SE
gen1 R10IE = varPtQt10–R10DE–R10SE
print R10IE

******* Revenue Decomposition Results *********

print R10DE R10SE R10IE

***** Revenue Decomposition Proportions *****

gen1 CERV10 = R10DE + R10SE + R10IE
gen1 R10DE = (R10DE/CERV10)*100
gen1 R10SE = (R10SE/CERV10)*100
gen1 R10IE = (R10IE/CERV10)*100
print CERV10 R10DE R10SE R10IE

******* Price Decomposition Results ***********

gen1 varP10t = va/(d–b)**2 + vc/(d–b)**2 – (2*cac)/(d–b)**2
gen1 P10DE = va/(d–b)**2
gen1 P10SE = vc/(d–b)**2
gen1 P10IE = –(2*cac)/(d–b)**2
gen1 PIE = varP10t–P10DE–P10SE
print varP10t P10DE P10SE P10IE PIE

***** Price Decomposition Proportions *****

gen1 CEPV10 = P10DE + P10SE + P10IE
gen1 P10DE = (P10DE/CEPV10)*100
gen1 P10SE = (P10SE/CEPV10)*100
gen1 P10IE = (P10IE/CEPV10)*100
print CERPV10 P10DE P10SE P10IE

******* Quantity Decomposition Results **********

gen1 varQ10t = ((d**2)*va)/(d–b)**2 + ((b**2)*vc)/(d–b)**2 – (2*b*d*cac) &
/(d–b)**2
gen1 Q10DE = ((d**2)*va)/(d–b)**2
gen1 Q10SE = ((b**2)*vc)/(d–b)**2
gen1 Q10IE = –(2*b*d*cac)/(d–b)**2
gen1 QIE = varQ10t–Q10DE–Q10SE
print varQ10t Q10DE Q10SE Q10IE QIE

***** Quantity Decomposition Proportions *****

gen1 CEQV10 = Q10DE + Q10SE + Q10IE
gen1 Q10DE = (Q10DE/CEQV10)*100
gen1 Q10SE = (Q10SE/CEQV10)*100
gen1 Q10IE = (Q10IE/CEQV10)*100
print CEQV10 Q10DE Q10SE Q10IE
```

Appendix 9.1: continued (VDM – PNG)

********* **Copper** (1961–1990) *********

```
sample 1 30
gen1 TNP11 = sum(NP11,30)
gen1 ANP11 = TNP11/20
gen1 TNQ11 = sum(NQ11,30)
gen1 ANQ11 = TNQ11/20
genr NR11 = NP11*NQ11
gen1 TNR11 = sum(NR11,30)
gen1 ANR11 = TNR11/20
gen1 b = –95*(ANQ11/ANP11)
genr ct = NQ11–b*NP11
gen1 d = 0.01*(ANQ11/ANP11)
genr ct = NQ11–d*NP11
genr atct = at*ct
genr at2 = at**2
genr ct2 = ct**2
gen1 PA1 = d/(d–b)**2
gen1 PA12 = (PA1)**2
gen1 PA2 = b/(d–b)**2
gen1 PA22 = (PA2)**2
genr NPt11 = (at–ct)/(d–b)
genr NQt11 = (at*d–ct*b)/(d–b)
genr NPtQt11 = PA1*(at**2)+PA2*(ct**2) – ((PA1+PA2)*at*ct)
print b at d ct PA1 PA12 PA2 PA22 NPt11 NQt11 NPtQt11
stat NP11 NQ11 NR11/mean=m1 variance=v1 covariance=v2
stat NP11 NQ11 NR11/pcov
stat at/mean=ea variance=va
stat ct/mean=ec variance=vc
gen1 ea2 = ea**2
genr da = at–ea
genr da3 = da**3
genr da4 = da**4
gen1 eda3 = da3/20
gen1 eda4 = da4/20
gen1 ec2 = ec**2
genr dc = ct–ec
genr dc3 = dc**3
genr dc4 = dc**4
gen1 edc3 = dc3/20
gen1 edc4 = dc4/20
stat at ct/cov=cac
matrix cac=(cac:1)'
gen1 cac=cac:2
print cac
```

******** Relationships in terms of Intercepts at & ct *********

```
gen1 vara2 = 4*ea2*va – va**2 + 4*ea*eda3 + eda4
gen1 varc2 = 4*ec2*vc – vc**2 + 4*ec*edc3 + edc4
gen1 varac = ec2*va + ea2*vc + 2*ea*ec*cac + ((da*dc–cac)/20)**2 + 2*ea*(da &
 *(dc**2))/20 + 2*ec*((da**2)*dc)/20
```

Appendix 9.1: continued (VDM – PNG)

```
gen1 cova2c2 = 4*ea*ec*cac + ((da**2)*(dc**2))/20 + 2*ea*((dc**2)*da)/20 + &
 2*ec*((da**2)*dc)/20 – va*vc
gen1 cova2ac = 2*ea2*cac + 2*ea*ec*va + 3*ea*((da**2)*dc)/20 + ec*eda3 + &
 (da3*dc)/20 – va*cac
gen1 covc2ac = 2*ec2*cac + 2*ec*ea*vc + 3*ec*((dc**2)*da)/20 + ea*edc3 + &
 (dc3*da)/20 – vc*cac
print vara2 varc2 varac cova2c2 cova2ac covc2ac

******* The Variance of Revenue (PtQt) *********

gen1 varPtQt11 = PA12*vara2 + PA22*varc2 + ((PA1+PA2)**2)*varac + 2*PA1*PA2 &
 *cova2c2 – 2*PA1*(PA1+PA2)*cova2ac – 2*PA2*(PA1*PA2)*covc2ac
print varPtQt11

******* Notice varPtQt11 = R11DE + R11SE + R11IE *********

gen1 d1 = va*((4*ea2)*PA12+((PA1+PA2)**2)*ec2–4*PA1*(PA1+PA2)*ea*ec) – &
 (va**2)*PA12
gen1 d2 = eda3*(4*ea*PA12) – 2*ec*PA1*(PA1+PA2)
gen1 d3 = eda4*PA12
gen1 R11DE = d1+d2+d3
print d1 d2 d3 R11DE
gen1 s1 = vc*((4*ec2)*PA12+((PA1+PA2)**2)*ea2–4*PA1*(PA1+PA2)*ec*ea) – &
 (vc**2)*PA12
gen1 s2 = edc3*(4*ec*PA12) – 2*ea*PA1*(PA1+PA2)
gen1 s3 = edc4*PA12
gen1 R11SE = s1+s2+s3
print s1 s2 s3 R11SE
gen1 R11IE = varPtQt11–R11DE–R11SE
print R11IE

******* Revenue Decomposition Results *********

print R11DE R11SE R11IE

***** Revenue Decomposition Proportions *****

gen1 CERV11 = R11DE + R11SE + R11IE
gen1 R11DE = (R11DE/CERV11)*100
gen1 R11SE = (R11SE/CERV11)*100
gen1 R11IE = (R11IE/CERV11)*100
print CERV11 R11DE R11SE R11IE

******* Price Decomposition Results **********

gen1 varP11t = va/(d–b)**2 + vc/(d–b)**2 – (2*cac)/(d–b)**2
gen1 P11DE = va/(d–b)**2
gen1 P11SE = vc/(d–b)**2
gen1 P11IE = –(2*cac)/(d–b)**2
gen1 PIE = varP11t–P11DE–P11SE
print varP11t P11DE P11SE P11IE PIE
```

Appendix 9.1: continued (VDM – PNG)

```
***** Price Decomposition Proportions *****

gen1 CEPV11 = P11DE + P11SE + P11IE
gen1 P11DE = (P11DE/CEPV11)*100
gen1 P11SE = (P11SE/CEPV11)*100
gen1 P11IE = (P11IE/CEPV11)*100
print CERPV11 P11DE P11SE P11IE

******* Quantity Decomposition Results **********

gen1 varQ11t = ((d**2)*va)/(d–b)**2 + ((b**2)*vc)/(d–b)**2 – (2*b*d*cac) &
/(d-b)**2
gen1 Q11DE = ((d**2)*va)/(d–b)**2
gen1 Q11SE = ((b**2)*vc)/(d–b)**2
gen1 Q11IE = –(2*b*d*cac)/(d–b)**2
gen1 QIE = varQ11t–Q11DE–Q11SE
print varQ11t Q11DE Q11SE Q11IE QIE

***** Quantity Decomposition Proportions *****

gen1 CEQV11 = Q11DE + Q11SE + Q11IE
gen1 Q11DE = (Q11DE/CEQV11)*100
gen1 Q11SE = (Q11SE/CEQV11)*100
gen1 Q11IE = (Q11IE/CEQV11)*100
print CEQV11 Q11DE Q11SE Q11IE


********* Gold (1961–1990) *********

sample 1 30
gen1 TNP12 = sum(NP12,30)
gen1 ANP12 = TNP12/15
gen1 TNQ12 = sum(NQ12,30)
gen1 ANQ12 = TNQ12/15
genr NR12 = NP12*NQ12
gen1 TNR12 = sum(NR12,30)
gen1 ANR12 = TNR12/15
gen1 b = –95*(ANQ12/ANP12)
genr ct = NQ12–b*NP12
gen1 d = 0.01*(ANQ12/ANP12)
genr ct = NQ12–d*NP12
genr atct = at*ct
genr at2 = at**2
genr ct2 = ct**2
gen1 PA1 = d/(d–b)**2
gen1 PA12 = (PA1)**2
gen1 PA2 = b/(d–b)**2
gen1 PA22 = (PA2)**2
genr NPt12 = (at–ct)/(d–b)
genr NQt12 = (at*d–ct*b)/(d–b)
genr NPtQt12 = PA1*(at**2)+PA2*(ct**2) – ((PA1+PA2)*at*ct)
print b at d ct PA1 PA12 PA2 PA22 NPt12 NQt12 NPtQt12
```

Appendix 9.1: continued (VDM – PNG)

```
stat NP12 NQ12 NR12/mean=m1 variance=v1 covariance=v2
stat NP12 NQ12 NR12/pcov
stat at/mean=ea variance=va
stat ct/mean=ec variance=vc
genl ea2 = ea**2
genr da = at–ea
genr da3 = da**3
genr da4 = da**4
genl eda3 = da3/15
genl eda4 = da4/15
genl ec2 = ec**2
genr dc = ct–ec
genr dc3 = dc**3
genr dc4 = dc**4
genl edc3 = dc3/15
genl edc4 = dc4/15
stat at ct/cov=cac
matrix cac=(cac:1)'
genl cac=cac:2
print cac

******** Relationships in terms of Intercepts at & ct *********

genl vara2 = 4*ea2*va – va**2 + 4*ea*eda3 + eda4
genl varc2 = 4*ec2*vc – vc**2 + 4*ec*edc3 + edc4
genl varac = ec2*va + ea2*vc + 2*ea*ec*cac + ((da*dc–cac)/15)**2 + 2*ea*(da &
 *(dc**2))/15 + 2*ec*((da**2)*dc)/15
genl cova2c2 = 4*ea*ec*cac + ((da**2)*(dc**2))/15 + 2*ea*((dc**2)*da)/15 + &
 2*ec*((da**2)*dc)/15 – va*vc
genl cova2ac = 2*ea2*cac + 2*ea*ec*va + 3*ea*((da**2)*dc)/15 + ec*eda3 + &
 (da3*dc)/15 – va*cac
genl covc2ac = 2*ec2*cac + 2*ec*ea*vc + 3*ec*((dc**2)*da)/15 + ea*edc3 + &
 (dc3*da)/15 – vc*cac
print vara2 varc2 varac cova2c2 cova2ac covc2ac

******* The Variance of Revenue (PtQt) *********

genl varPtQt12 = PA12*vara2 + PA22*varc2 + ((PA1+PA2)**2)*varac + 2*PA1*PA2 &
 *cova2c2 – 2*PA1*(PA1+PA2)*cova2ac – 2*PA2*(PA1*PA2)*covc2ac
print varPtQt12

******* Notice varPtQt12 = R12DE + R12SE + R12IE *********

genl d1 = va*((4*ea2)*PA12+((PA1+PA2)**2)*ec2–4*PA1*(PA1+PA2)*ea*ec) – &
 (va**2)*PA12
genl d2 = eda3*(4*ea*PA12) – 2*ec*PA1*(PA1+PA2)
genl d3 = eda4*PA12
genl R12DE = d1+d2+d3
print d1 d2 d3 R12DE
genl s1 = vc*((4*ec2)*PA12+((PA1+PA2)**2)*ea2–4*PA1*(PA1+PA2)*ec*ea) – &
 (vc**2)*PA12
genl s2 = edc3*(4*ec*PA12) – 2*ea*PA1*(PA1+PA2)
```

Appendix 9.1: continued (VDM – PNG)

```
gen1 s3 = edc4*PA12
gen1 R12SE = s1+s2+s3
print s1 s2 s3 R12SE
gen1 R12IE = varPtQt12–R12DE–R12SE
print R12IE

******* Revenue Decomposition Results *********

print R12DE R12SE R12IE

***** Revenue Decomposition Proportions *****

gen1 CERV12 = R12DE + R12SE + R12IE
gen1 R12DE = (R12DE/CERV12)*100
gen1 R12SE = (R12SE/CERV12)*100
gen1 R12IE = (R12IE/CERV12)*100
print CERV12 R12DE R12SE R12IE

******* Price Decomposition Results ***********

gen1 varP12t = va/(d–b)**2 + vc/(d–b)**2 – (2*cac)/(d–b)**2
gen1 P12DE = va/(d–b)**2
gen1 P12SE = vc/(d–b)**2
gen1 P12IE = –(2*cac)/(d–b)**2
gen1 PIE = varP12t–P12DE–P12SE
print varP12t P12DE P12SE P12IE PIE

***** Price Decomposition Proportions *****

gen1 CEPV12 = P12DE + P12SE + P12IE
gen1 P12DE = (P12DE/CEPV12)*100
gen1 P12SE = (P12SE/CEPV12)*100
gen1 P12IE = (P12IE/CEPV12)*100
print CERPV12 P12DE P12SE P12IE

******* Quantity Decomposition Results **********

gen1 varQ12t = ((d**2)*va)/(d–b)**2 + ((b**2)*vc)/(d–b)**2 – (2*b*d*cac) &
/(d–b)**2
gen1 Q12DE = ((d**2)*va)/(d–b)**2
gen1 Q12SE = ((b**2)*vc)/(d–b)**2
gen1 Q12IE = –(2*b*d*cac)/(d–b)**2
gen1 QIE = varQ12t–Q12DE–Q12SE
print varQ12t Q12DE Q12SE Q12IE QIE

***** Quantity Decomposition Proportions *****

gen1 CEQV12 = Q12DE + Q12SE + Q12IE
gen1 Q12DE = (Q12DE/CEQV12)*100
gen1 Q12SE = (Q12SE/CEQV12)*100
gen1 Q12IE = (Q12IE/CEQV12)*100
print CEQV12 Q12DE Q12SE Q12IE
```

Appendix 9.1: continued (VDM – PNG)

****** Var–Cov Matrix for Sectoral Aggregates ********

```
genr NAg = NR1 + NR2 + NR3 + NR4 + NR5 + NR9 + NR10
genr NMn = NR11 + NR12
genr NFr = NR7
genr NMr = NR8
print NAg NMn NFr NMr
stat NAg NMn NFr NMr/pcov
```

****** Var–Cov Matrix for Individual Commodities *******

```
stat NR1 NR2 NR3 NR4 NR5 NR6 NR7 NR8 NR9 NR10 NR11 NR12/pcov

stop
```

Appendix 9.2: The best guessed estimates of price elasticities of annual demand and supply for the commodities of the SPINs

Commodities	Price elasticity of: demand	supply
Coffee	−100	0.05
Cocoa	−100	0.05
Copra	−100	0.30
Copra/Coconut oil	−100	0.15
Rubber	−90	0.15
Tea	−100	0.05
Palm oil & kernel	−100	0.10
Sugar	−100	0.10
Molasses	−50	0.20
Logs	−90	0.01
Forestry	−90	0.01
Marine	−95	0.05
Fish	−95	0.05
Copper	−95	0.01
Gold	−95	0.01
Beef	−100	0.05

Source: Fleming and Piggott (1989).