Appendix 1: Seasonal Data Set for Fresh Fruit

Table 1.1: Prices ($p_n^{t,m}$) (New Israeli shekel per kilo)

Year, n	Month, m	Lemons	Apricots	Avocado	Watermelon	Persimmon	Grapefruit	Bananas
1997	1	3.42	0	3.42	0	5.81	2.81	3.79
	2	3.34	0	3.71	0	5.81	2.74	3.88
	3	3.43	0	3.78	0	6.67	2.78	3.76
	4	3.89	0	4.03	0	0	2.9	4.24
	5	4.35	0	5.07	3.65	0	2.81	5.39
	6	6.76	8.81	6.44	2.03	0	3.01	6.77
	7	7.7	8.01	7.25	1.56	0	3.41	9.73
	8	9.15	0	0	1.46	0	3.63	9.43
	9	8.36	0	7.65	1.56	0	4.48	7.57
	10	6.47	0	5.65	0	6.7	4.31	7
	11	4.79	0	4.35	0	5.34	3.61	6.74
	12	3.9	0	3.95	0	5.44	2.9	5.86
1998	1	3.51	0	3.82	0	5.75	2.69	4.49
	2	3.45	0	3.72	0	5.88	2.42	4.09
	3	3.42	0	3.78	0	0	2.46	4
	4	3.68	0	3.98	0	0	2.57	3.98
	5	4.19	0	4.6	3.34	0	2.95	3.97
	6	5.9	6.11	5.18	1.67	0	3.39	5.01
	7	6.38	6.64	5.81	1.57	0	3.77	7.12
	8	7.39	0	9.16	1.74	0	3.7	7.52
	9	7.58	0	8.79	0	0	4.74	5.88
	10	7.06	0	6.34	0	7.85	4.36	5.71
	11	5.88	0	5.44	0	6.71	4.16	4.76
	12	4.94	0	5.71	0	7.1	3.37	4.19
1999	1	4.55	0	6.28	0	7.61	3.2	3.89
	2	4.22	0	6.14	0	0	3	3.75
	3	4.17	0	6.5	0	0	3.05	3.67
	4	4.62	0	7.56	0	0	3.22	4.16
	5	5.47	0	10.58	2.47	0	3.45	5.07
	6	7	8.82	13.66	1.7	0	3.88	6.14
	7	7.88	0	0	1.4	0	0	6.36
	8	7.96	0	0	1.42	0	4.13	5.94
	9	7.19	0	8.42	0	0	4.4	4.69
	10	5.68	0	5.84	0	7.5	4.33	4.3
	11	4.85	0	4.95	0	6.23	3.73	4.06
	12	4.32	0	4.64	0	6.41	3.4	3.81
2000	1	4.06	0	4.56	0	7.14	3.29	4.07
	2	3.83	0	4.35	0	7.66	3.19	4.4

	3	3.69	0	3.85	0	0	3.1	4.58
	4	3.49	0	3.67	0	0	3.27	5.13
	5	4.24	0	4.48	2.74	0	3.44	7.58
	6	5.7	7.32	5.56	1.65	0	3.87	7.58
	7	8.15	7.61	6.55	1.76	0	4.24	8.12
	8	10.92	0	9.04	1.93	0	0	7.85
	9	7.84	0	9.26	1.93	0	0	6.12
	10	6.18	0	6.55	0	7.41	5.65	5.83
	11	5.3	0	5.09	0	6.11	4.26	5.71
	12	4.65	0	4.93	0	6.02	3.73	5.49
2001	1	4.15	0	5.03	0	6.35	3.41	5.33
	2	3.86	0	4.86	0	7.01	3.19	5.11
	3	3.70	0	5.04	0	0	3.17	4.84
	4	3.91	0	5.14	0	0	3.32	4.45
	5	4.4	0	6.73	0	0	3.59	4.66
	6	5.78	8.45	8.33	2.21	0	3.75	5.31
	7	6.46	8.86	0	1.97	0	4.66	6.56
	8	6.69	0	0	1.96	0	5.69	6.42
	9	5.62	0	8.88	0	0	0	5.42
	10	5.21	0	6.69	0	7.77	0	5.4
	11	4.57	0	4.97	0	6.75	4.12	4.91
	12	4.31	0	4.75	0	6.82	3.9	4.56
2002	1	4.1	0	4.97	0	7.15	3.56	4.65
	2	3.91	0	4.62	0	7.76	3.48	4.67
	3	3.67	0	4.32	0	0	3.44	4.54
	4	3.94	0	4.7	0	0	3.64	5.72
	5	4.05	10.6	4.74	2.89	0	3.75	5.94
	6	4.21	6.46	5.07	1.99	0	4	6.2
	7	5.84	6.51	0	1.6	0	3.83	7.81
	8	6.58	0	0	1.91	0	0	7.64
	9	6.19	0	9.61	0	0	5.69	6.8
	10	5.48	0	6.32	0	7.93	5.11	6.52
	11	4.8	0	6.22	0	6.28	4.23	5.84
	12	4.22	0	6.33	0	5.91	3.76	5.36

Table 1.2: Expenditures ($p_n^{t,m}$ $q_n^{t,m}$)[1]

Year, n	Month, m	Lemons	Apricots	Avocado	Watermelon	Persimmon	Grapefruit	Bananas
1997	1	1.7	0.1	4.3	0	1.1	0.3	17.7
	2	2.5	0	3.6	0.3	0.9	1.7	14.8
	3	1.9	0	3.7	0.7	0.2	1.4	15.3

[1] The given data set of expenditures has been further adjusted for the purpose of calculations: in the months where the price for the good is equal to 0, we assume that the expenditure also equals 0.

	4	2.4	0.1	3	3.4	0	1.4	17.5
	5	2.1	0.2	2.7	11	0	1.5	11.8
	6	3.2	6.4	2.3	28.9	0	1.6	6.2
	7	2.2	7.4	1.6	27.8	0.1	0.8	1
	8	2.9	0.8	0.5	22.2	0	0.7	1.5
	9	2.8	0	0.5	13.3	0	0.5	2.4
	10	2.8	0	1.7	2.7	1.6	0.6	6.7
	11	2.4	0	3.5	0.4	3.6	1.2	13.3
	12	2.2	0.1	5.1	0.2	3.6	0.9	15
1998	1	1.7	0	3.8	0	3	0.7	14.4
	2	2.2	0	4.8	0	1.9	0.8	16.9
	3	2.6	0.1	3.8	0.6	0.7	1	17.4
	4	2.8	0.2	3.2	2.6	0.1	1.7	17.5
	5	2.6	1.1	2.8	22.2	0.1	0.7	12.5
	6	2.4	10.4	1.6	26	0	0.4	7.2
	7	3.7	6.9	1.4	23.6	0	0.7	3.2
	8	2.6	0.3	0.8	24.6	0.2	0.7	3.2
	9	2.9	0.1	1.1	11.7	0.2	1.1	4.5
	10	3.6	0.1	2.1	1.8	0.8	0.4	8.9
	11	3.2	0	4.3	0.3	3.4	1.2	13.8
	12	2.8	0	4	0.2	2.7	0.9	14.7
1999	1	2.1	0.1	4.3	0	1.5	1	16.1
	2	2.4	0.1	4.3	0.1	1.7	1.1	14.2
	3	2.1	0	4.4	0.4	0.3	1.1	15
	4	3	0.1	4	4.3	0.2	1.2	13.6
	5	3.2	2.2	2.2	21	0.3	1.7	11.5
	6	2.8	11	1.9	26.7	0	0.8	6.7
	7	3.1	6	0.4	25.7	0	0.8	4
	8	2.6	0.5	0.2	19.4	0.1	0.4	3.7
	9	2.8	0.2	1.1	9.4	0.4	0.6	6.1
	10	2.8	0	2.6	1.4	1.6	0.9	8.3
	11	2.5	0.3	5.2	0.2	3.7	1.4	12.7
	12	2.6	0	4.4	0	3.4	0.7	12.3
2000	1	2.2	0.2	3.7	0	2.9	1	11
	2	2.7	0	4.2	0	2.3	1	13.6
	3	3.1	0	3.6	0.1	0.6	1.4	12.7
	4	2.6	0	3.2	3.6	0.1	1	14.2
	5	3.1	1.2	3	18	0	1.1	8.5
	6	2.4	8.9	1.6	25.4	0.1	0.6	4.7
	7	3.2	7.1	1.6	25.7	0	0.2	2
	8	3.8	0.4	1.1	21.3	0	0.5	2.5
	9	2.6	0.1	1.1	9.9	0.1	0.3	4.6

	10	2.9	0.1	2.5	1.8	1.5	0.6	9.4
	11	3.1	0	5	0.7	3.9	1	11.3
	12	2.6	0.3	4	0.2	3.5	0.9	13.7
2001	1	2.3	0	4.2	0	4.1	1.4	13.5
	2	2.9	0.2	3.7	0.2	2	0.9	14
	3	2.6	0.2	3.6	0.8	1.7	1.2	13.8
	4	2.9	0.1	3	5.9	0.1	0.8	13.7
	5	2.4	2.5	2.5	21.1	0	0.7	10.1
	6	2.8	10.1	2.3	23.3	0	0.9	5.8
	7	3	3.6	2.1	23.6	0	0.4	4
	8	3.3	0.1	1.1	17	0	0.3	3
	9	3.4	0.1	1.4	5.2	0.2	0.1	4.8
	10	3.7	0.2	4.1	1.8	2.4	0.6	9.4
	11	3.1	0	6.3	0.5	4.4	1	13.2
	12	2.5	0.1	5	0.5	3.4	0.8	13.5
2002	1	1.8	0.2	16	0	3.2	1.2	12.7
	2	3	0.1	15	0.5	1.9	1.3	16.4
	3	3.5	0.1	14.2	0.7	1.1	1.1	14.4
	4	3.7	0.1	14.2	9.9	0.4	1.1	14.5
	5	2.8	4	13.6	17.3	0.1	1.2	11
	6	2.8	10.6	13.1	21.6	0	0.7	6.9
	7	3.3	3.8	16	25.1	0	0.7	3.4
	8	3.9	0.3	20.5	18.4	0	0.1	3.2
	9	3.4	0.1	16.8	10.6	0.2	0.4	3.8
	10	2.8	0	17.3	1	2.1	0.4	7.3
	11	2.8	0	16.7	0.3	4.5	0.7	11.5
	12	2.8	0	21.4	0.4	5	0.9	14.7

Appendix 2: Seasonal Data Set for Fresh vegetables

Table 2.1: Prices ($p_n^{t,m}$) (New Israeli shekel per kilo)

Year, n	Month, m	Cabbage	Cauliflower	Cucumbers	Potatoes	Carrots	Lettuce	Eggplants
1997	1	2.09	3.1	3.21	2.37	3.16	3.01	3.28
	2	2.5	3.77	5	2.54	3.16	3.05	6.31
	3	2.67	3.92	5.49	3.23	3.26	3.14	6.49
	4	2.34	4.04	4.46	3.17	3.26	3.12	5.55
	5	2.4	3.63	2.98	2.91	3.13	3.18	4.07
	6	2.24	4.1	2.56	2.64	3.02	3.26	3.33
	7	2.12	4.5	2.96	2.56	3.07	3.25	2.63
	8	2.61	4.54	2.96	2.93	3.33	3.46	2.82
	9	2.83	4.51	2.73	2.93	3.55	3.45	2.74
	10	2.71	4.19	3.35	3.05	3.86	3.53	2.99
	11	2.55	4	3.44	3.04	3.52	3.61	3.12
	12	2.45	3.8	3.27	2.86	3.11	3.44	3.03
1998	1	2.36	3.4	3.11	2.71	2.81	3.29	3.21
	2	2.28	3.13	2.99	2.58	2.76	3.1	3.61
	3	2.18	3.54	3.47	2.42	2.67	3.17	4.12
	4	2.18	3.51	4.14	2.46	2.77	3.18	4.64
	5	2.12	4.24	3.26	2.44	2.84	3.28	5.03
	6	2.27	4.8	2.67	2.34	3.12	3.32	3.14
	7	2.33	4.88	2.69	2.36	3.39	3.39	2.94
	8	3.76	5.65	3.35	2.65	3.88	3.99	2.95
	9	7.4	7.24	3.75	2.94	4.27	5.1	3.33
	10	6.38	6.18	3.53	3.25	4.54	5.04	3.43
	11	3.84	5.56	3.09	3.32	4.14	4.23	3.32
	12	3.05	4.89	4.43	3.26	3.72	3.7	3.16
1999	1	3.21	3.99	3.25	3.18	3.59	3.26	4.39
	2	2.72	3.4	3.19	3.09	3.47	3.26	4.8
	3	2.27	3.98	3.05	2.81	3.21	2.89	4.15
	4	2.34	3.46	3.15	2.76	3.18	2.91	3.8
	5	2.2	3.54	2.78	2.45	3.12	3.07	3.38
	6	2.24	4.15	2.86	2.4	3.28	3.16	3.2
	7	2.33	5.61	3.05	2.39	3.38	3.28	3.07
	8	2.67	6.02	2.99	2.71	3.29	3.5	3.17
	9	2.93	5.33	3.51	2.77	3.31	3.68	3.13
	10	2.86	4.95	4.34	2.86	3.58	3.72	3.22
	11	2.65	5	3.67	2.97	3.59	3.56	3.03
	12	2.76	5.24	5.02	3.57	3.74	3.52	3.88
2000	1	2.6	3.69	4.33	3.18	3.86	3.5	4.45
	2	2.56	3.82	4.45	2.98	3.88	3.6	6.38

	3	2.44	4.44	4.18	2.9	3.7	3.29	5.67
	4	2.24	3.89	3.16	2.53	3.25	3	4.85
	5	2.28	3.79	2.68	2.52	3.38	3.27	4.51
	6	2.29	4.25	2.95	2.44	3.24	3.43	3.28
	7	2.86	5.09	3.33	2.61	3.28	3.45	2.85
	8	3.71	5.42	2.96	3.09	3.49	3.68	2.94
	9	3.65	5.1	3.21	3.14	3.69	3.84	2.96
	10	3.25	5.09	4.02	3.3	3.99	3.79	3.31
	11	3.03	5.32	4.26	3.21	3.89	3.77	3.41
	12	3.02	4.54	3.87	2.99	3.85	3.73	3.31
2001	1	2.96	4.16	3.06	2.67	3.63	3.63	3.31
	2	2.81	4.1	3.26	2.45	3.41	3.53	3.52
	3	2.65	4.14	3.13	2.34	3.21	3.3	3.62
	4	2.57	4.49	3.47	2.58	3.36	3.39	4.57
	5	2.5	4.46	3.5	2.88	3.55	3.49	4.14
	6	2.52	4.8	3.24	3.1	3.73	3.62	3.72
	7	2.55	5.12	3.35	3.43	3.9	3.56	3.4
	8	2.71	5.25	4.64	3.76	3.99	3.61	3.54
	9	2.87	6.21	5.18	3.77	4.26	3.93	4.11
	10	3.01	5.51	4.03	4.08	4.38	3.88	3.75
	11	2.95	5.1	3.7	4.29	4.23	3.89	3.65
	12	3.46	4.66	4.29	3.94	4.12	3.91	3.72
2002	1	3.38	4.64	5.96	3.51	3.97	3.95	5.19
	2	3.3	4.45	4.86	3.6	4.03	3.83	6.34
	3	2.97	4.17	3.75	3.44	3.93	3.53	4.74
	4	2.91	4.17	3.87	3.42	3.94	3.57	4.95
	5	2.6	4.24	3.09	3.27	3.83	3.57	4.4
	6	2.56	4.68	3.41	3.17	3.75	3.62	3.55
	7	2.44	5.51	3.41	3.07	3.63	3.52	3.22
	8	3.49	6	3.99	3.16	3.82	3.98	3.63
	9	4.72	6.38	4.11	3.33	4.06	4.31	3.79
	10	4.54	5.15	4.66	3.28	4.3	4.08	3.64
	11	3.36	5.5	4.53	3.03	4.18	3.93	3.24
	12	3.07	5.04	4.25	3.03	4.08	3.69	4.01

Table 2.2: Expenditures ($p_n^{t,m} q_n^{t,m}$)

Year, n	Month, m	Cabbage	Cauliflower	Cucumbers	Potatoes	Carrots	Lettuce	Eggplants
1997	1	5.1	3	15.6	21.5	5.2	2.9	3.9
	2	4.2	3.1	13.3	16.4	4.4	2.7	3.1
	3	3.8	2.6	15.1	19.1	4.4	2.4	4.2
	4	4.1	2.2	17	21.1	4.8	3.4	2.8
	5	3.1	1.4	14.3	22.1	4.2	3.8	2.2

	6	3.1	1.2	12.2	18.6	4	2.2	3.9
	7	3.3	1.6	12	16.7	3.3	2.2	4
	8	2.5	1.1	11.8	16.9	3	1.8	4.7
	9	2.1	1.2	9.9	18.5	3.8	2.3	3.1
	10	3.4	2.2	12.2	21.2	4.5	2.6	3.6
	11	4.1	2	13.3	20	4.6	2.5	3.9
	12	3.9	2.4	11.2	17.5	4.1	2.4	3.3
1998	1	3.3	2.6	10.2	19.9	4.4	3.1	1.6
	2	4.3	2.7	12.9	19.9	4.1	2.9	3.7
	3	3.9	2.3	13.4	18	4.1	2.7	2.9
	4	3.2	2	15.2	18.7	3.7	4.1	3.9
	5	3.4	1.9	15.2	18.3	3.9	3.2	4.1
	6	2.9	1.3	13.2	16.6	3.6	1.8	4.4
	7	2.7	1.6	13.1	14.2	3.6	2.2	4.1
	8	2.8	1.4	12.6	17	3.3	2.1	3.4
	9	3.7	1.7	16.1	19.5	4	2.9	3.8
	10	6.4	2.1	15.5	19.2	4.2	3.5	4.9
	11	5.2	2.3	12.8	19.5	5.4	3.3	4.2
	12	4	2.8	11.5	19	4.7	3.4	3
1999	1	5.2	4	10.3	19.8	5.8	3.3	3.1
	2	5	3.1	11.6	19	4.6	2.9	3.9
	3	4.2	1.9	12.4	18.7	4.4	3.4	2.4
	4	4.2	2.9	13.3	20	4.3	3.7	2.5
	5	3.6	1.9	12.8	19.6	4.3	3.2	4.2
	6	3.7	1.2	15.2	18.8	4.1	3.3	4.5
	7	3.1	1.1	13.9	16.3	4.3	2.7	4.5
	8	2.8	1.2	11.6	17	4	1.8	4.7
	9	3.7	1.8	14.8	19.6	4	3.1	4.8
	10	3.3	2	13.1	16.1	3.9	3	4.3
	11	3.7	2.1	13.2	17.9	4.1	3.7	3.2
	12	4.5	2.8	16.3	22.3	4.7	2.9	3.8
2000	1	3.1	1.4	10	20.2	5.2	2.7	1.9
	2	4.4	2.6	13.8	21.6	7.2	3.3	3.1
	3	3.8	2.4	12.8	20	4.6	3.3	4
	4	3.7	2.7	13.4	19.2	4.5	4.1	3
	5	4.2	2.1	12.5	19.1	4.2	4.4	3.5
	6	3.5	1.3	12.5	14.4	4.2	3.4	3.8
	7	3.4	0.9	12.5	17.2	4.3	2.8	3.3
	8	4.7	1.3	12.6	17.6	3.5	3.1	3.7
	9	3.9	1.2	13.8	19.6	3.9	3.3	3.6
	10	5.5	2.9	14.4	22.7	5.6	4.5	4.9
	11	4.3	1.7	13.5	19.5	5.3	3.9	3.6
	12	4.1	2.7	13.3	20.5	4.6	3.6	3.4
2001	1	4.6	2.5	10.5	19.9	5	4.8	2.2
	2	4.1	2.2	10.7	15.8	4.9	3.9	3

	3	4.8	2.5	11.4	18	4.9	3.8	3.4
	4	3.6	2.8	13.1	19.2	4.2	3.8	3.4
	5	3.2	1.1	13.1	15.7	3.9	3.6	3.6
	6	3.4	1.2	12	16.6	4.6	3.3	3.3
	7	4.1	1.5	12.5	17.6	5.3	3.7	3.8
	8	3.9	1.3	14.7	20.7	5	3.1	4.2
	9	4.4	1.9	16.2	22.3	4.8	3.6	4.7
	10	5.3	2.4	15.4	21	5.6	4.4	4.3
	11	4.5	2.7	14.5	25.5	5.9	4.8	3.5
	12	5	2.9	13.1	23.1	6.1	4.3	2.7
2002	1	4.8	2.9	13.6	22.7	5.5	3.9	2.8
	2	6.3	3.4	19.1	23.2	4.7	5.6	3.4
	3	5.3	2.9	14.5	21.5	5	5	3.2
	4	5.3	2.7	14.2	22.7	5.2	5.6	5.2
	5	4.4	1.8	13.6	19.4	4.7	4.7	3.6
	6	4.4	1.8	13.5	18.2	4.3	4.3	4.7
	7	4	0.9	13.9	16.8	4.8	4.4	4.3
	8	4.8	2.5	14.7	19.3	3.6	4.1	3.9
	9	4.5	1.3	13.3	17.9	4.9	4.3	3.2
	10	5.3	1.9	15.2	20.1	4.4	5.2	3.1
	11	5.3	2.4	16.3	18.4	6.7	4.5	3.9
	12	4.7	3.1	14.9	20.8	5.8	4.2	3.8

Appendix 3: Formulae for Methods of Treatment of Seasonal Products

1. Year over Year Monthly Indices

For each month m=1,2,…,12, let S(m) denote the set of products that are available for purchase in each year t=0,1,…,T. For t = 0,1,…,T and m = 1,2,…,12, let $p_n^{t,m}$ and $q_n^{t,m}$ denote the price and quantity of product n that is available in month m of year t for n belongs to S(m). Then *the year over year monthly Laspeyres, Paasche and Fisher indices* going from month m of year t to month m of year t+1, in price relative and monthly revenue share form, can be defined as follows:

$$P_L = \sum_{n \in S(m)} s_n^{t,m} \left(p_n^{t+1,m} / p_n^{t,m} \right); \qquad m=1,2,\ldots,12;$$

$$P_P = \left[\sum_{n \in S(m)} s_n^{t+1,m} \left(p_n^{t+1,m} / p_n^{t,m} \right)^{-1} \right]^{-1}; \qquad m=1,2,\ldots,12;$$

$$P_F = \sqrt{P_L P_P} \,.$$

where the monthly revenue share for product $n \in S(m)$ for month m in year t is defined as:

$$s_n^{t,m} = \frac{p_n^{t,m} q_n^{t,m}}{\sum_{i \in S(m)} p_i^{t,m} q_i^{t,m}}; \qquad m=1,2,\ldots,12;\ n \in S(m);\ t = 0,1,\ldots,T$$

Approximate year over year monthly Laspeyres and Paasche indices are defined as follows:

$$P_{AL} = \sum_{n \in S(m)} s_n^{0,m} \left(p_n^{t+1,m} / p_n^{t,m} \right); \qquad m=1,2,\ldots,12;$$

$$P_{AP} = \left[\sum_{n \in S(m)} s_n^{0,m} \left(p_n^{t+1,m} / p_n^{t,m} \right)^{-1} \right]^{-1}; \qquad m=1,2,\ldots,12;$$

Where $s_n^{0,m}$ is the base period monthly revenue share.

2. Year over Year Annual Indices

Using the notation introduced above, *the Laspeyres and Paasche annual (chain link) indices* comparing the prices of year t with those of year t+1 can be defined as follows:

$$P_L = \sum_{m=1}^{12} \sum_{n \in S(m)} \sigma_m^t s_n^{t,m} \left(p_n^{t+1,m} / p_n^{t,m} \right);$$

$$P_P = \left[\sum_{m=1}^{12} \sum_{n \in S(m)} \sigma_m^{t+1} s_n^{t+1,m} \left(p_n^{t+1,m} / p_n^{t,m} \right)^{-1} \right]^{-1}.$$

where the revenue share for month m in year t is defined as:

$$\sigma_n^t = \frac{\sum_{n \in S(m)} p_n^{t,m} q_n^{t,m}}{\sum_{i=1}^{12} \sum_{j \in S(i)} p_j^{t,i} q_j^{t,i}}; \qquad m = 1,2,\ldots,12;\ t = 0,1,\ldots,T$$

The current year weights, $s_n^{t,m}$ and $\_{m}^{t}$ and $s_n^{t+1,m}$ and $\_{m}^{t+1}$ can be approximated by the corresponding base year weights, $s_n^{0,m}$ and $\_{m}^{0}$.

There is no need to restrict attention to calendar year comparisons: any 12 consecutive months of price and quantity data could be compared to the price and quantity data of the base year, provided that the January data in the non-calendar year is compared to the January data of the base year, the February data of the non-calendar year is compared to the February data of the base year, …, and the December data of the non-calendar year is compared to the December data of the base year. Alterman, Diewert, and Feenstra (1999; 70) called the resulting indices *rolling year* or *moving year indices*.

3. Maximum Overlap Month to Month Price Indices

Let there be N products that are available in some month of some year and let $p_n^{t,m}$ and $q_n^{t,m}$ denote the price and quantity of product n that is in the marketplace in month m of year t (if the product is unavailable, define let $p_n^{t,m}$ and $q_n^{t,m}$ to be 0). Let $p^{t,m}$ _ $[p_1^{t,m},p_2^{t,m},\ldots,p_N^{t,m}]$ and $q^{t,m}$ _ $[q_1^{t,m},q_2^{t,m},\ldots,q_N^{t,m}]$ be the month m and year t price and quantity vectors respectively. Let S(t,m) be the set of products that is present in month m of year t *and the following month*.

Define the revenue shares of product n in month m and m+1 of year t, using the set of products that are present in month m of year t and the subsequent month, as follows:

$$\text{(a)}\quad s_n^{t,m}(t,m) = \frac{p_n^{t,m}q_n^{t,m}}{\sum_{i\in S(t,m)} p_i^{t,m}q_i^{t,m}}; \qquad m=1,2,\ldots,11;\ n\in S(t,m);$$

$$\text{(b)}\quad s_n^{t,m+1}(t,m) = \frac{p_n^{t,m+1}q_n^{t,m+1}}{\sum_{i\in S(t,m)} p_i^{t,m+1}q_i^{t,m+1}}; \qquad m=1,2,\ldots,11;\ n\in S(t,m);$$

$s_n^{t,m+1}(t,m)$ has to be distinguished from $s_n^{t,m+1}(t,m+1)$. The revenue share $s_n^{t,m+1}(t,m)$ is the share of product n in month m+1 of year t but where n is restricted to the set of products that are present in month m of year t and the subsequent month, whereas $s_n^{t,m+1}(t,m+1)$ is the share of pruduct n in month m+1 of year t but where n is restricted to the set of products that are present in month m+1 of year t and the subsequent month.

If product n is present in month m of year t and the following month, define $s_n^{t,m}(t,m)$ using (a); if this is not the case, define $s_n^{t,m}(t,m) = 0$. Similarly, if product n is present in month m of year t and the following month, define $s_n^{t,m+1}(t,m)$ using (b); is this is not the case, define $s_n^{t,m+1}(t,m) = 0$.

Using these share definitions, Laspeyres and Paasche formulae can be written in revenue share and price form as follows[2]:

$$P_L = \sum_{n\in S(t,m)} s_n^{t,m}(t,m)\left(p_n^{t+1,m}/p_n^{t,m}\right); \qquad m=1,2,\ldots,11;$$

$$P_P = \left[\sum_{n\in S(t,m)} s_n^{t,m+1}(t,m)\left(p_n^{t+1,m}/p_n^{t,m}\right)^{-1}\right]^{-1}; \qquad m=1,2,\ldots,11;$$

4. Annual Basket Indices

The *Lowe index* for month m is defined by the following formula:

[2] It is important that the revenue shares that are used in an index number formula add up to unity. The use of unadjusted expenditure shares would lead to a systematic bias in the index number formula.

$$P_{LO} = \frac{\sum_{n=1}^{N} p_n^m q_n}{\sum_{n=1}^{N} p_n^0 q_n}$$

where $p^0 \equiv [p_1^0,\ldots,p_N^0]$ is the price reference period price vector, $p^m \equiv [p_1^m,\ldots,p_N^m]$ is the current month m price vector and $q \equiv [q_1,\ldots,q_N]$ is the weight reference year quantity vector.

The *Young (1812) index* is defined as follows:

$$P_Y = \sum_{n=1}^{N} s_n (p_n^m / p_n^0)$$

where $s \equiv [s_1,\ldots,s_N]$ is the weight reference year vector of revenue shares.

The *geometric Laspeyres index* is defined as follows:

$$P_{GL} = \prod_{n=1}^{N} (p_n^m / p_n^0)^{s_n}$$

Thus the geometric Laspeyres index makes use of the same information as the Young index except that a geometric average of the price relatives is taken instead of arithmetic one.

It is of interest to compare the above three indices that use annual baskets to the fixed base Laspeyres rolling year indices. However, the rolling year index that ends in the current month is centered five and a half months backwards. Hence the above annual basket type indices may be compared with an arithmetic average of two rolling year indices that have their last month 5 and 6 months forward. This latter *centered rolling year index* is labeled P_{CRY} and is mentioned in Figures 5 and 7 in the paper.

5. Bean and Stine Type C or Rothwell Indices

The *Bean and Stine Type C* (1924; 31) or *Rothwell* (1958; 72*) index* makes use of seasonal baskets in the base year, denoted as the vectors $q^{0,m}$ for the months m = 1,2,…,12. The index also makes use of a vector of base year unit value prices, $p^0 \equiv [p_1^0,\ldots,p_5^0]$ where the nth price in this vector is defined as:

$$p_n^0 \equiv \frac{\sum_{m=1}^{12} p_n^{0,m} q_n^{0,m}}{\sum_{m=1}^{12} q_n^{0,m}};$$

The *Rothwell price index* for month m in year t can now be defined as follows:

$$P_R = \frac{\sum_{n=1}^{N} p_n^{t,m} q_n^{0,m}}{\sum_{n=1}^{N} p_n^0 q_n^{0,m}}; \qquad m = 1,\ldots,12.$$

To make the different series more comparable, the *normalized Rothwell index* P_{NR} is introduced; this index is simply equal to the original Rothwell index divided by its first observation.

6. Forecasting Rolling Year Indices using Month to Month Annual Basket Indices

For each of the series, Lowe, Young and Geometric Laspeyres, a seasonal adjustment factor (SAF) is defined, as the centered rolling year index P_{CRY} divided by P_{LO}, P_Y and P_{GL}, respectively for the first 12 observations. Now for each of the three series, repeat these 12 seasonal adjustment factors for the remaining observations. These operations will create 3 SAF series for all the observations (label them SAF_{LO}, SAF_Y and SAF_{GL}, respectively).

Finally, define *seasonally adjusted Lowe, Young and Geometric Laspeyres indices* by multiplying each unadjusted index by the appropriate seasonal adjustment factor.

$P_{LOSA} \equiv P_{LO} SAF_{LO} ; P_{YSA} \equiv P_Y SAF_Y ; P_{GLSA} \equiv P_{GL} SAF_{GL}$.

A seasonally adjusted version of the Rothwell index presented in the paper may also be defined in the same way.