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The Specification of Institutional Features in the Determination of Wages in Canadian Manufacturing Industries

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THE SPECIFICATION OF INSTITUTIONAL FEATURES
IN THE DETERMINATION OF WAGES IN CANADIAN
MANUFACTURING INDUSTRIES

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THE SPECIFICATION OF INSTITUTIONAL FEATURES IN
THE DETERMINATION OF WAGES IN CANADIAN
MANUFACTURING INDUSTRIES

J. C. R. Rowley and D. A. Wilton

DISCUSSION PAPER NO. 85

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As demonstrated in a recent paper¹, quarterly models of wage determination are highly sensitive, both with respect to parametric estimates and statistical inferences, to the specification of institutional features in the labour market². In the context of these sensitivities, this paper attempts to eliminate a severe deficiency in relevant data by the provision, in tabular form, of time-series which summarize evidence for critical institutional features of the Canadian labour market. The first section contains a brief overview of the data set and examines certain issues such as the coverage of the sample, seasonal patterns in bargaining and the average lengths of contracts. This overview is followed in the second section by an account of a particular analytical model which incorporates these institutional features in a form appropriate for estimation of behavioural parameters. Finally, some statistics for the institutional characteristics of the labour market (by reference to the analytical model) are provided in the form of a collection of variable weights. These weights will be employed in a subsequent paper for which the behavioural parameters of the market will be estimated.

I

This account of the institutional features of the Canadian labour market is based upon a detailed examination of wage contracts which were negotiated in the manufacturing sector during the period extending from 1955 to 1968. Sources of the basic set of data include the record files of the Department of Labour, the Public Archives, the collection of the Industrial Relations Centre at McGill University, and a large number of accounts provided by Canadian newspapers. Over two hundred bargaining units are included

in the final data set³. These were concerned with approximately sixteen hundred wage contracts within the period covered by the sample.

In many respects, a classification which is based on the number of bargaining units does not provide an adequate indication of the coverage of the sample. Master agreements, which concern many establishments within the same company, and identical (master) settlements, which concern many different firms, are only counted as individual agreements⁴. A better indication of coverage is revealed by the number of employees directly affected by contracts which belong to the sample. In this particular sample, almost two-thirds of union members and over forty percent of all employees in the manufacturing industries are affected by the constituent contracts. (These figures are based on the coverage for the middle year of the sample, 1962.) The contents of Table 1 indicate the sectoral distribution⁵ of the sample. By reference to eleven industrial sub-sectors, the lowest sectoral coverage in the sample is one-quarter of all production workers; namely, in the sector for non-metallic mineral products with 25.9 percent coverage. Four of these eleven industrial sub-sectors are represented by more than one-half of their production employees.

Three important conclusions are indicated by a review of the general features of wage settlements within the sample. These concern the lengths of individual wage contracts, incidence of front-end loading within contracts, and the temporal distribution of wage bargaining within industrial sub-sectors. The conclusions are presented sequentially below:

(1) The duration of individual wage contracts typically exceeds one year. Only 26 percent of the contracts in the sample were for a period of one year or less⁶. The average lengths of contracts signed in each year for

TABLE 1
SAMPLE COVERAGE BY EMPLOYMENT
(1962)

	<u>Employees in Sample</u>	<u>Production Workers Employed in Industry</u>	<u>% Coverage By Employment</u>
Food and Beverages	34,100	107,200	31.8%
Rubber	7,100	15,100	47.2%
Textiles	17,800	47,800	37.2%
Clothing	23,000	77,000	29.9%
Wood Products	39,500	72,400	54.5%
Paper	44,200	75,300	58.7%
Printing	8,600	31,700	27.3%
Metals	139,800	236,600	59.1%
Electrical Products	29,500	58,000	51.0%
Non-Metallic Mineral Products	7,500	29,100	25.9%
Chemicals	9,300	27,200	34.1%
Total Manufacturing	360,700	846,200	42.6%

each industrial sub-sector are cited in Table 2. These representative figures are in terms of months and the averages are defined over the numbers of employees covered rather than over contracts. There is a general tendency for the average durations of contracts to increase through time. Further, there is considerable variation of these average figures both through time and between industrial sub-sectors.

(2) A multi-year contract usually contains an arrangement for several increments during its currency. Since such contracts are prevalent in Canadian manufacturing industry, account must be taken of the distribution of the increments over the durations of particular contracts and of the relative sizes of these increments. (Front-end loading occurs when the earlier increments under a particular contract exceed the latter ones.) The contracts in the sample were apportioned between distinct temporal categories according to their durations in years. Internal increments within each multi-term contract were clustered to form quasi-annual increments (that is, the total increments in each of the years covered by the contract). Each quasi-annual increment was then converted to a percentage of the wage rate which prevailed when the contract was signed. The resultant figures were scaled by the proportion of employees covered by the contract to form the indices which are provided in Table 3. A high degree of front-end loading is clearly revealed by these indices. As summary statistics, it should be noted that, on average, the first increment of a two-year contract is 75 percent greater than the second increment, and the first increment of a three-year contract is 126 percent and 208 percent greater than the second and third increments respectively. Any relationship between the average settlements over contracts and the durations of contracts is obscured by the general tendency for contractual lengths to increase through the period of the sample and by changes

TABLE 2
AVERAGE LENGTH OF CONTRACTS SIGNED IN A GIVEN YEAR

	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	Average over 1955-1968
Food and Beverages	17.6	20.7	17.9	20.0	22.7	22.7	18.9	21.4	20.7	20.5	28.2	32.5	24.4	26.1	22.4
Rubber	13.3	12.0	13.2	12.4	15.4	12.0	16.0	12.0	25.7	N.S.	36.0	24.0	N.S.	36.0	18.6
Textiles	14.6	26.3	33.8	15.3	20.5	37.4	23.1	24.5	27.8	27.0	31.0	31.9	16.9	24.0	26.9
Clothing	24.4	31.0	28.8	26.7	16.0	29.2	24.7	27.0	34.7	36.8	36.0	36.0	36.0	36.0	29.9
Wood Products	24.0	24.0	12.0	13.3	24.0	24.0	12.0	24.0	N.S.	25.9	N.S.	24.0	36.0	25.4	20.8
Paper	14.4	22.9	13.8	22.0	18.9	12.7	15.4	14.1	20.5	13.7	30.9	24.0	13.1	24.9	19.5
Printing	23.9	21.0	24.0	29.3	26.5	28.4	24.0	24.8	24.0	29.5	33.0	N.S.	25.4	26.1	26.6
Metals	17.0	24.7	22.4	29.7	30.2	24.9	31.5	32.5	32.0	30.3	31.3	30.7	32.5	32.4	27.7
Chemicals	14.2	18.1	14.8	14.6	22.4	18.8	22.9	18.2	25.6	21.0	28.5	23.9	24.0	24.6	21.1
Electrical Products	12.9	26.5	21.9	22.4	24.2	26.4	20.0	19.1	26.5	31.5	24.9	25.3	31.4	20.4	23.9
Non-metallic Mineral Products	17.4	21.2	15.2	15.8	23.4	24.0	24.0	33.8	27.1	24.0	30.9	24.0	19.9	27.8	23.5
Total Manufacturing	17.2	24.0	19.1	21.9	25.0	22.8	21.3	24.1	25.9	26.2	30.7	29.3	28.3	28.9	24.2

N.S. - None signed in a particular year.

TABLE 3

DISTRIBUTION OF INCREMENTS THROUGHOUT CONTRACT PERIOD
(1955-1968)

	ONE YEAR CONTRACTS	TWO YEAR CONTRACTS		THREE YEAR CONTRACTS		
	% Increment	% Increment in First Year	% Increment in Second Year	% Increment in First Year	% Increment in Second Year	% Increment in Third Year
Food and Beverages	4.20	6.46	3.41	9.09	6.88	4.38
Rubber	3.64	3.71	1.82	10.62	5.19	3.86
Textiles	2.64	7.87	3.02	5.92	4.43	4.30
Clothing	1.86	5.89	1.82	15.71	3.28	2.19
Wood Products	2.08	5.64	5.19	11.05	5.35	1.60
Paper	4.48	4.91	2.83	11.10	5.25	5.26
Printing	4.36	6.63	3.40	7.73	3.87	1.47
Metals	4.56	5.59	2.79	9.28	4.18	3.26
Chemicals	4.90	6.96	3.67	7.22	2.52	1.56
Electrical Products	4.30	5.73	2.63	9.14	4.56	2.16
Non-metallic Mineral Products	5.40	6.96	3.51	8.81	3.82	3.72
Total Manufacturing	3.89	5.81	3.32	9.84	4.35	3.20

in bargaining conditions.

(3) Three assumptions form the bases for many of the analyses of wage determination which use quarterly time-series. These stipulate one-year contracts, with a single increment for each contract on its date of signing, and a uniform distribution of contracts (by number of employees) over the four quarters for any year⁷. The first two of these assumptions are refuted by the evidence cited in the previous two paragraphs and the final assumption must be reconsidered in the light of the statistics contained in Table 4. For each industrial sub-sector, this table records the percentage of the workers (within the coverage of the sample) who bargain in each quarter of each year of the sample and the percentage of employees who receive an increment in each quarter. There is considerable variation in the first collection of percentages both intertemporally and intersectorally, with a significant number of zero entries. The prevalence of multi-term contracts might be expected to result in less variability in the second collection of percentages, as compared with the first collection, and this result is confirmed by the entries. However, for use in the explanation of wage determination, each member of the second collection must be identified with a date upon which the increment was negotiated. The temporal patterns of these dates for different quarters exhibit marked variability so that explanatory variables in econometric approaches require complicated dating schemes. (Internal increments in multi-term contracts must be explained in terms of the economic conditions which prevailed when the increments were negotiated and not those which prevailed when they were received.)

The three conclusions, derived from the features of the contractual data in the sample, can be summarized by the assertion that the labour bargains

TABLE 4

SEASONAL DISTRIBUTION OF WAGE ADJUSTMENTS
FOOD AND BEVERAGES

	Percentage of Employees Bargaining in Each Quarter				Percentage of Employees Receiving an Increment in Each Quarter			
	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Quarter 1	Quarter 2	Quarter 3	Quarter 4
1955	9.78	12.90	5.66	9.75	10.75	23.89	39.17	15.62
1956	3.34	15.87	45.98	15.74	6.44	18.61	45.98	18.15
1957	9.15	16.75	3.34	4.29	14.80	30.33	47.83	11.13
1958	9.56	9.63	56.27	2.55	15.68	13.16	66.90	4.05
1959	7.97	13.52	24.77	2.16	8.18	17.99	64.80	12.12
1960	2.45	46.42	6.54	.00	5.70	60.33	23.00	8.15
1961	11.46	10.52	18.74	.00	7.16	62.22	22.05	.00
1962	3.18	45.22	25.50	2.35	12.01	51.26	34.99	4.56
1963	10.00	14.83	4.93	18.19	16.83	58.08	11.17	24.42
1964	.00	32.90	28.28	1.88	20.27	30.66	45.11	1.88
1965	7.09	12.94	28.94	2.93	8.24	52.62	36.18	6.83
1966	4.21	15.10	22.41	11.64	21.44	40.38	29.76	33.21
1967	3.67	8.72	17.18	.00	22.95	48.69	26.82	4.79
1968	1.87	9.70	10.66	10.46	5.56	11.81	21.18	17.46

TABLE 4 (CONT'D)

SEASONAL DISTRIBUTION OF WAGE ADJUSTMENTS

RUBBER

	Percentage of Employees Bargaining in Each Quarter				Percentage of Employees Receiving an Increment in Each Quarter			
	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Quarter 1	Quarter 2	Quarter 3	Quarter 4
1955	55.78	44.22	.00	.00	55.78	44.22	.00	.00
1956	69.20	21.04	.00	.00	69.20	21.04	.00	.00
1957	68.64	7.92	23.66	.00	68.64	7.92	23.66	.00
1958	24.91	22.00	28.23	.00	35.37	22.00	28.23	.00
1959	41.26	42.15	.00	14.99	41.26	42.15	.00	7.45
1960	39.40	31.46	.00	.00	60.81	39.19	.00	.00
1961	.00	76.82	26.08	.00	.00	76.82	26.08	.00
1962	.00	60.89	.00	15.10	.00	84.90	.00	15.10
1963	.00	59.46	40.75	.00	.00	84.35	30.47	.00
1964	.00	.00	.00	.00	41.46	44.37	14.17	.00
1965	.00	53.05	24.30	.00	.00	62.57	37.08	.00
1966	.00	11.25	6.83	.00	43.86	58.70	6.83	.00
1967	.00	.00	.00	.00	46.86	29.92	6.83	.00
1968	.00	33.96	36.37	29.36	.00	27.63	42.76	29.36

TABLE 4 (CONT'D)
SEASONAL DISTRIBUTION OF WAGE ADJUSTMENTS

TEXTILES

	Percentage of Employees Bargaining in Each Quarter				Percentage of Employees Receiving an Increment in Each Quarter			
	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Quarter 1	Quarter 2	Quarter 3	Quarter 4
1956	.00	38.66	43.10	7.11	62.00	62.16	29.65	10.14
1957	.00	9.91	10.49	2.74	62.00	9.91	36.02	5.48
1958	.00	.00	8.48	3.28	62.00	14.84	11.41	6.57
1959	.00	6.12	12.99	10.84	5.38	16.93	16.01	10.84
1960	40.65	15.03	.00	11.98	81.31	8.92	16.40	22.65
1961	.00	21.78	4.72	4.20	42.31	33.67	13.28	.00
1962	36.69	15.09	11.73	6.15	40.97	30.28	19.84	6.15
1963	.00	.00	3.66	14.34	40.10	19.13	15.47	24.75
1964	8.61	34.82	13.46	18.61	8.61	38.56	16.49	30.18
1965	10.87	.00	.00	.00	52.07	18.25	14.61	8.72
1966	.00	39.39	28.73	5.80	10.82	53.17	31.50	2.52
1967	.00	.00	10.24	12.61	67.45	8.58	17.91	16.10
1968	9.23	.00	12.28	.00	56.00	9.39	15.43	8.18

TABLE 4 (CONT'D)

SEASONAL DISTRIBUTION OF WAGE ADJUSTMENTS

CLOTHING

	Percentage of Employees Bargaining in Each Quarter				Percentage of Employees Receiving an Increment in Each Quarter			
	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Quarter 1	Quarter 2	Quarter 3	Quarter 4
1955	6.62	11.00	23.44	11.00	.00	.00	23.44	7.64
1956	11.00	15.21	48.67	11.00	14.27	10.14	53.74	11.00
1957	8.07	17.71	7.38	4.88	8.07	7.38	17.71	11.00
1958	9.43	21.96	11.00	11.00	14.15	31.31	9.81	11.00
1959	11.00	39.53	7.91	11.00	9.30	39.53	17.67	14.88
1960	9.30	11.00	64.26	9.44	.00	.00	30.21	23.18
1961	10.09	11.00	11.00	4.35	50.00	11.00	16.23	4.35
1962	9.57	19.57	7.79	8.89	2.61	9.57	27.27	23.86
1963	8.49	6.37	42.46	11.00	10.83	15.71	11.00	11.00
1964	11.00	15.52	11.00	3.16	53.29	9.76	66.52	5.71
1965	12.48	2.64	7.20	11.00	22.08	2.64	7.20	8.64
1966	6.46	11.00	47.05	11.00	6.46	2.73	47.05	17.25
1967	11.00	14.90	7.45	11.00	11.00	2.73	81.97	11.00
1968	14.35	18.75	11.00	11.00	20.28	18.75	68.57	7.44

TABLE 4 (CONT'D)
SEASONAL DISTRIBUTION OF WAGE ADJUSTMENTS
WOOD PRODUCTS

	Percentage of Employees Bargaining in Each Quarter				Percentage of Employees Receiving an Increment in Each Quarter			
	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Quarter 1	Quarter 2	Quarter 3	Quarter 4
1955	1.00	0.00	79.52	1.00	1.00	0.00	100.00	1.00
1956	0.00	0.00	24.14	0.00	0.00	79.52	24.14	0.00
1957	0.00	0.00	75.86	1.00	0.00	0.00	100.00	0.00
1958	0.00	0.00	86.05	0.00	0.00	0.00	76.74	0.00
1959	13.95	0.00	0.00	76.74	23.26	0.00	23.26	76.74
1960	0.00	0.00	6.02	10.13	13.95	76.74	6.02	10.13
1961	0.00	0.00	83.54	0.00	16.46	0.00	100.00	0.00
1962	0.00	0.00	100.00	0.00	0.00	0.00	106.33	0.00
1963	0.00	0.00	0.00	0.00	0.00	83.54	16.46	0.00
1964	0.00	0.00	100.00	0.00	0.00	0.00	100.00	0.00
1965	0.00	0.00	0.00	0.00	5.13	94.87	0.00	0.00
1966	0.00	0.00	80.65	0.00	15.38	0.00	87.10	12.90
1967	0.00	0.00	4.61	0.00	0.00	80.65	4.61	0.00
1968	0.00	13.16	82.24	0.00	0.00	17.76	82.24	0.00

TABLE 4 (CONT'D)
SEASONAL DISTRIBUTION OF WAGE ADJUSTMENTS
PAPER

	Percentage of Employees Bargaining in Each Quarter				Percentage of Employees Receiving an Increment in Each Quarter			
	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Quarter 1	Quarter 2	Quarter 3	Quarter 4
1955	0.00	74.27	17.86	1.58	.00	70.42	19.65	4.84
1956	0.00	82.57	0.00	0.00	.00	84.02	15.73	1.88
1957	0.00	12.14	2.16	0.00	.00	84.24	3.85	.00
1958	11.91	19.72	5.30	46.28	11.91	19.72	19.99	49.44
1959	6.78	10.33	5.42	16.86	7.94	1.21	15.80	16.86
1960	0.00	59.22	14.04	4.52	.00	63.94	24.06	76.99
1961	2.85	2.30	56.21	35.52	6.89	3.67	60.99	41.44
1962	2.76	42.84	24.25	5.38	5.97	55.10	39.51	5.38
1963	4.50	56.06	26.08	2.36	7.38	52.85	36.69	2.36
1964	0.00	23.61	10.62	0.00	.00	15.84	22.84	.00
1965	0.00	20.67	44.10	30.25	.00	10.89	58.83	49.83
1966	0.00	3.25	15.14	1.53	65.17	14.33	20.90	72.04
1967	0.00	2.98	5.78	1.20	4.56	24.82	91.34	8.10
1968	0.00	35.69	33.40	24.45	11.67	35.69	33.40	25.84

TABLE 4 (CONT'D)
SEASONAL DISTRIBUTION OF WAGE ADJUSTMENTS
PRINTING

	Percentage of Employees Bargaining in Each Quarter				Percentage of Employees Receiving an Increment in Each Quarter			
	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Quarter 1	Quarter 2	Quarter 3	Quarter 4
1955	21.47	13.46	12.04	.00	41.47	13.46	24.08	29.42
1956	10.72	47.83	.00	.00	32.15	68.75	25.49	34.37
1957	30.06	.00	.00	.00	43.39	.00	.00	36.78
1958	11.47	15.71	13.06	27.43	43.93	15.71	28.74	79.36
1959	30.81	6.65	.00	9.76	30.81	32.02	.00	35.37
1960	17.65	11.76	.00	.00	54.12	63.53	22.94	36.47
1961	.00	49.41	.00	.00	17.65	70.59	22.94	9.20
1962	31.03	.00	.00	11.76	68.97	35.63	.00	38.82
1963	18.63	8.00	8.00	6.67	37.27	16.00	8.00	20.00
1964	24.00	20.00	.00	.00	82.67	52.00	.00	6.67
1965	7.45	51.85	.00	27.59	48.45	70.37	7.41	67.82
1966	.00	.00	.00	.00	39.66	20.11	12.64	33.33
1967	22.59	.00	.00	.00	63.05	13.49	22.59	5.86
1968	23.32	40.00	13.13	.00	37.62	60.89	81.49	7.76

TABLE 4 (CONT'D)
SEASONAL DISTRIBUTION OF WAGE ADJUSTMENTS
METALS

	Percentage of Employees Bargaining in Each Quarter				Percentage of Employees Receiving an Increment in Each Quarter			
	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Quarter 1	Quarter 2	Quarter 3	Quarter 4
1955	29.30	11.99	29.44	8.71	21.03	24.61	32.02	14.27
1956	14.99	6.12	31.55	17.86	17.54	13.85	56.35	21.11
1957	8.46	5.10	8.65	13.55	14.25	20.72	48.74	24.35
1958	2.46	2.51	2.99	30.22	8.99	8.24	13.44	47.57
1959	36.06	8.31	6.97	5.83	57.11	15.19	29.91	43.70
1960	3.82	2.45	2.42	8.47	16.98	7.54	29.55	36.79
1961	4.55	11.44	4.04	23.57	18.61	18.43	11.14	36.67
1962	25.89	7.30	3.72	5.46	46.62	20.36	11.30	38.92
1963	6.28	1.94	11.71	0.51	16.93	12.34	27.43	35.95
1964	2.78	9.35	5.09	24.37	9.37	19.68	18.95	31.49
1965	30.60	8.87	4.58	4.91	61.19	17.86	23.19	48.58
1966	0.75	4.47	22.44	13.52	8.37	16.74	25.93	54.91
1967	2.94	4.31	1.83	0.28	10.90	15.89	28.81	13.53
1968	31.70	10.16	13.30	8.19	41.81	38.13	40.34	44.20

TABLE 4 (CONT'D)
 SEASONAL DISTRIBUTION OF WAGE ADJUSTMENTS
 ELECTRICAL PRODUCTS

	Percentage of Employees Bargaining in Each Quarter				Percentage of Employees Receiving an Increment in Each Quarter			
	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Quarter 1	Quarter 2	Quarter 3	Quarter 4
1955	13.38	30.48	2.82	13.56	28.46	29.11	4.24	12.23
1956	33.85	43.83	7.51	4.68	39.16	45.44	13.97	29.00
1957	6.77	23.57	.00	6.26	14.98	43.16	12.87	31.31
1958	6.81	9.19	6.39	6.73	31.90	11.20	9.90	30.08
1959	47.08	3.83	7.99	1.72	50.63	11.58	10.30	25.57
1960	6.80	6.74	1.94	18.21	45.37	12.94	12.09	22.45
1961	10.39	30.85	4.54	15.83	12.91	35.81	9.50	34.47
1962	12.43	32.61	8.00	6.50	15.57	36.46	15.62	36.11
1963	.00	32.44	3.84	14.54	13.05	37.89	11.89	36.49
1964	2.38	20.63	7.04	4.72	29.96	25.07	19.10	19.80
1965	.00	8.56	28.52	11.27	2.47	23.84	36.44	29.11
1966	10.22	4.66	5.88	.00	46.71	27.58	11.83	6.11
1967	5.26	38.31	33.43	5.27	11.95	47.89	31.45	31.86
1968	1.43	16.07	5.55	.00	32.19	33.72	15.45	20.16

TABLE 4 (CONT'D)

SEASONAL DISTRIBUTION OF WAGE ADJUSTMENTS

NON-METALLIC MINERAL PRODUCTS

	Percentage of Employees Bargaining in Each Quarter				Percentage of Employees Receiving an Increment in Each Quarter			
	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Quarter 1	Quarter 2	Quarter 3	Quarter 4
1955	11.73	19.71	44.94	.00	11.73	19.71	44.94	.00
1956	.00	20.71	45.25	.00	.00	34.21	49.51	.00
1957	.00	6.78	38.08	4.32	.00	6.78	47.01	4.32
1958	11.33	14.02	41.10	.00	22.66	18.31	71.00	.00
1959	11.00	7.17	25.64	24.35	18.21	7.17	25.64	24.35
1960	12.75	12.56	10.89	8.85	48.97	19.31	19.06	13.12
1961	.00	32.19	10.42	.00	21.43	6.80	54.85	10.39
1962	.00	11.97	9.98	36.70	.00	18.58	45.02	36.70
1963	.00	40.82	.00	.00	.00	12.09	62.86	25.05
1964	.00	4.90	8.56	.00	.00	11.62	65.13	15.17
1965	7.82	25.78	10.88	32.79	7.82	14.48	47.53	32.79
1966	.00	6.13	21.39	.00	7.88	12.71	63.78	15.83
1967	8.39	17.53	.00	.00	45.09	31.20	68.80	16.84
1968	9.01	10.13	.00	9.95	25.63	32.99	10.61	9.95

TABLE 4 (CONT'D)

SEASONAL DISTRIBUTION OF WAGE ADJUSTMENTS

CHEMICALS

	Percentage of Employees Bargaining in Each Quarter				Percentage of Employees Receiving an Increment in Each Quarter			
	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Quarter 1	Quarter 2	Quarter 3	Quarter 4
1955	5.17	11.79	22.68	7.02	17.95	24.56	36.03	42.03
1956	7.56	18.78	25.09	24.05	7.56	6.83	66.65	24.05
1957	21.41	6.35	18.96	6.87	25.83	34.35	36.65	13.99
1958	23.80	.00	6.79	17.69	41.30	6.98	16.46	29.16
1959	20.61	37.91	12.18	15.34	20.61	51.87	12.18	20.90
1960	.00	6.01	21.36	11.60	25.51	10.71	33.56	35.21
1961	15.22	4.73	16.26	26.84	21.20	19.04	16.26	38.47
1962	4.96	6.45	6.42	.00	20.17	11.07	37.37	17.39
1963	18.41	19.52	5.06	33.32	33.81	41.25	10.47	33.32
1964	18.44	15.60	.00	.00	46.05	15.60	10.50	38.67
1965	8.65	9.41	.00	10.71	37.20	13.77	10.47	16.07
1966	9.94	43.08	18.63	.00	18.15	52.35	18.63	20.92
1967	3.19	.00	9.74	4.74	56.16	7.75	20.44	10.07
1968	14.06	34.72	25.98	.00	22.31	34.72	41.13	15.99

TABLE 4 (CONT'D)
SEASONAL DISTRIBUTION OF WAGE ADJUSTMENTS
TOTAL MANUFACTURING

	Percentage of Employees Bargaining in Each Quarter				Percentage of Employees Receiving an Increment in Each Quarter			
	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Quarter 1	Quarter 2	Quarter 3	Quarter 4
1955	15.86	20.05	26.34	6.68	14.62	25.71	33.57	11.41
1956	11.52	23.00	26.04	9.89	14.54	36.62	39.67	14.77
1957	7.80	8.98	15.16	7.06	11.78	27.05	41.70	15.06
1958	5.88	7.25	19.67	19.19	13.01	11.55	27.64	29.90
1959	23.39	10.84	8.31	15.71	33.90	14.94	25.85	34.66
1960	6.19	14.97	9.12	8.12	20.63	29.87	22.51	31.70
1961	5.14	12.68	21.32	15.89	18.30	21.99	30.13	23.70
1962	15.02	18.66	19.82	5.75	25.67	27.83	30.01	23.30
1963	5.36	14.88	12.55	5.16	14.49	34.46	22.02	22.54
1964	2.67	15.03	18.49	11.13	15.77	19.71	34.12	17.32
1965	14.58	11.09	13.27	8.31	31.86	30.51	25.90	31.60
1966	2.16	7.69	26.02	7.11	22.00	20.98	31.31	38.36
1967	2.84	7.63	7.86	1.54	17.02	28.01	36.45	11.48
1968	15.50	15.54	20.05	7.73	27.91	36.53	39.95	26.69

in Canadian manufacturing industries are characterized by multi-term contracts, with substantial front-end loading, and instability in both temporal duration and relative distribution of signing dates over quarters. With respect to the latter point, the conventional assumption of equal proportions of the labour force bargaining in each quarter is clearly contradicted by the entries in Table 4.

II

The following set of assumptions and definitions specify a model to include the important institutional features of the labour market which were indicated in the preliminary survey of the sample's contracts.

[A1] There are $J(t)$ distinct micro groups (individual bargaining units) in the labour force during the t -th time period. Let L_t^j represent the number of workers in the j -th group and let L_t represent the total number of workers in a specific collective of micro groups (e.g., those within the industrial sub-sector, say non-metallic mineral products) in the t -th time period. If the ratios L_t^j/L_t are denoted b_t^j , the aggregative wage index w_t for the collective of groups can be expressed in terms of these ratios and the wage-indices $\{w_t^j\}$ for constituent micro groups in the collective.

$$w_t = \sum_{j=1}^{J(t)} b_t^j w_t^j .$$

Appendix III contains quarterly time-series for the aggregative wage indices for total manufacturing industry and its eleven industrial sub-sectors.

[A2] The wage bargain for any micro group is a linear function of values for K explanatory variables $\{x_k^{j,t}\}$ and stochastic errors associated specifically with the period in which the bargain is arranged. Each bargain is

normalized to represent the average annual change in wages over the duration of the contract. Thus, if the j -th group bargains in the t -th period, then

$$\frac{w_s^j - w_{s-4}^j}{w_{s-4}^j} = \sum_{k=1}^K a_k^j x_k^{j,t} + u^{j,t} \quad (1)$$

where "s" is used to denote the average annual increment over the contract and the t -superscripts denote a particular dating pattern (the quarter in which a contract was negotiated). Appendix I contains a discussion of a wage-determination model in terms of quarterly changes in wage indices. This is contrasted with the model of annual overlapping changes which is presented here.

[A3] Each group in a collective considers the same collection of explanatory variables, albeit sometimes at different points in time. Also, the micro parameters $\{a_k^j\}$ associated with a particular explanatory variable are the same for each micro group⁸.

$$x_k^{j,t} = x_k^t \quad \text{for } j=1, 2, \dots, J(t) \text{ and all } t$$

$$a_k^j = a_k \quad \text{for } j=1, 2, \dots, J(t) \text{ and all } t.$$

[A4] The apportionment of the average wage change over the entire contract period into internal increments can be represented by an adjustment factor λ_t^j . That is,

$$\frac{w_t^j - w_{t-4}^j}{w_{t-4}^j} = \lambda_t^j \left(\frac{w_s^j - w_{s-4}^j}{w_{s-4}^j} \right) \quad (2)$$

As shown below, institutional details such as front-end loading can be incorporated into this adjustment factor.

Combining [A1] and [A4] produces the following wage equation for the j-th micro group, where the superscripts indicate particular dating patterns.

$$\frac{w_t^j - w_{t-4}^j}{w_{t-4}^j} = \lambda_t^j \left(\sum_{k=1}^K a_k x_k^t + u^{j,t} \right) \quad (3)$$

[A5] The annual change in the aggregative wage index for a collective can be appropriately approximated by a weighted sum of annual micro changes⁹.

$$\begin{aligned} \frac{w_t - w_{t-4}}{w_{t-4}} &= \sum_{j=1}^{J(t)} b_t^j \left(\frac{w_t^j - w_{t-4}^j}{w_{t-4}^j} \right) \\ &= \sum_{j=1}^{J(t)} b_t^j \lambda_t^j \left(\sum_{k=1}^K a_k x_k^t + u^{j,t} \right) \\ &= \sum_{k=1}^K a_k \sum_{j=1}^{J(t)} b_t^j \lambda_t^j x_k^t + \sum_{j=1}^{J(t)} b_t^j \lambda_t^j u^{j,t} \end{aligned}$$

That is,

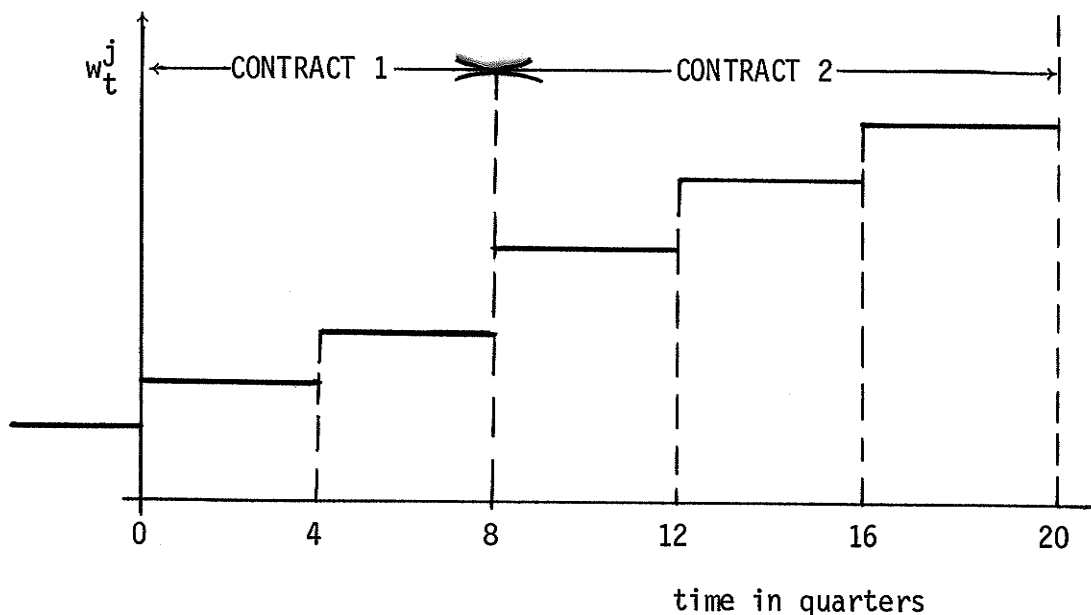
$$\frac{w_t - w_{t-4}}{w_{t-4}} = \sum_{k=1}^K a_k \bar{x}_{k,t} + \bar{u}_t \quad (4)$$

where $\bar{x}_{k,t}$ and \bar{u}_t are specially constructed moving averages derived implicitly from b_t^j , λ_t^j , x_k^t and $u^{j,t}$.

Before we present the weights required for these moving averages, two features deserve further description; namely, the particular dating pattern alluded to above and the characteristics of the scale factor λ_t^j . To illustrate the former feature, consider a five-year period for the j-th group. During this period, the group is assumed to negotiate a two-year contract followed by a three-year contract. Its hypothetical wage chronology is

is illustrated in Chart 1.

CHART 1. WAGE CHRONOLOGY WITH TWO CONTRACTS



The annual increments under these two contracts indicate five discrete steps in the level of the j -th wage index. Each of these increments will appear in four successive terms of the overlapping sequence of annual changes $\{(w_t^j - w_{t-4}^j)$ for $t=1, 2, \dots\}$. Thus, for an econometric model which seeks to explain this sequence, the observations for successive values of the explanatory variables follow a disjoint lag pattern as indicated in Table 5 for the case where front-end loading is absent. A non-zero weight (the proportion of the collective's labour force in the j -th group in this case) is recorded for each step in the wage index, lagged by the interval between signing and implementation dates of the increment. It will also be recorded in the three successive rows, lagged an additional quarter in each.

TABLE 5
 QUARTERLY PATTERN OF LAGS FOR WAGE CHRONOLOGY

TIME	LAG IN DATING PATTERN																				
	0	1	2	3	4	5	6	7	8	9	10	11									
0	b^j																				
1		b^j																			
2			b^j																		
3				b^j																	
4					b^j																
5						b^j															
6							b^j														
7								b^j													
8	b^j								b^j												
9		b^j								b^j											
10			b^j								b^j										
11				b^j								b^j									
12					b^j								b^j								
13						b^j								b^j							
14							b^j								b^j						
15								b^j								b^j					
16									b^j								b^j				
17										b^j								b^j			
18											b^j								b^j		
19												b^j								b^j	
20	b^j																				b^j

The scale factors $\{\lambda_t^j\}$ are based upon the temporal distributions of the internal increments which are contained in the set of contracts for each of the bargaining units after these increments have been normalized to annual equivalents. (See [A2].) For a given group receiving an increment in a particular quarter, the scale factor is defined as the product of the particular increment and the duration of the contract in number of years divided by the arithmetic sum¹⁰ of increments over the whole contract which is currently operative. To obtain a composite weight, the scale factor λ_t^j for each internal increment is multiplied by a proportional element b_t^j . This collection

of products are then placed in the appropriate lag positions in the composite-weight matrix.

Four examples demonstrate the versatility of this formulation. (The issue of discounts for future locked-in internal increments is considered in Appendix II.)

EXAMPLE ONE. A three-year contract with three annual increments of 12, 10 and 8 cents respectively would be represented by the values 1.2, 1.0 and 0.8 for the scale factor.

EXAMPLE TWO. A multi-year contract with equal annual increments would be represented by unit values of this scale factor.

EXAMPLE THREE. If a contract calls for one increment over an 18 month period, then the scale factor is 1.5 for this increment. Implicitly, two quarters of this contract would have zero scale factors.

EXAMPLE FOUR. If there are two increments in one year, say of size 12 cents and 8 cents and occurring six months apart, then λ_t^j would be 0.6 and 0.4 for the two increments. However, two successive rows of the weight matrix (the third and fourth quarters after the date of the signing for the contract) would contain both of these values so the joint scaling factor is unity.

III

Each of the $J(t)$ constituent micro groups in the labour force for some specific collective has a set of weights $\{b_t^j, \lambda_t^j\}$ calculated for each quarter in the sample. These weights are aggregated within each of the eleven industrial sub-sectors and for total manufacturing. The results are

recorded in the twelve sections of Table 6. Eventually these weights for collectives will be used to create moving averages, of appropriate lengths, for explanatory variables in the model of wage determination which is outlined above. They will also be used to generate the variance-covariance matrix for the concomitant stochastic errors in the model so that Aitken estimators¹¹ can be calculated and the problem of the Yule-Slutsky effect avoided.

In conclusion, we would again point out the dramatic differences between the weights that we have tabulated and those used by many other analysts of the determinants of wages. Our weight matrices contain many more entries due to the prevalence of multi-term contracts and substantial variations between different industrial sub-sectors, between different quarters in particular years, and between particular quarters in different years. These latter two variations persist for total manufacturing and are not smoothed to insignificance by the process of aggregation.

TABLE 6
WEIGHTS FOR MOVING AVERAGES
Food and Beverages

YEAR	LAGS IN QUARTERS												
	0	1	2	3	4	5	6	7	8	9	10	11	12
1955 Q1	.098	.524	.348	.042	.004								
1955 Q2	.111	.098	.557	.348	.012	.004							
1955 Q3	.017	.111	.098	.761	.174	.012	.004						
1955 Q4	.081	.097	.129	.098	.259	.174	.012	.004					
1956 Q1	.034	.107	.097	.129	.255	.174	.012	.004					
1956 Q2	.170	.034	.126	.097	.018	.223	.174	.012					
1956 Q3	.557	.170	.034	.126	.080	.018	.174	.012					
1956 Q4	.162	.557	.170	.034	.058		.223	.012					
1957 Q1	.087	.192	.557	.186	.004	.031							
1957 Q2	.155	.087	.196	.592	.016	.004	.049						
1957 Q3	.028	.172	.087	.264	.260	.016	.004	.049					
1957 Q4	.039	.045	.172	.087	.125	.260	.016	.004	.062				
1958 Q1	.058	.039	.056	.210	.017	.098	.260	.004	.062	.062			
1958 Q2	.100	.096	.043	.056	.055	.017	.095	.226		.026			
1958 Q3	.689	.117	.096	.086	.028	.038	.017	.027	.064		.026		
1958 Q4	.023	.689	.117	.096	.047	.022	.038	.017	.003	.064		.026	
1959 Q1	.056	.023	.692	.141	.038	.047	.011	.017	.003	.064	.064		
1959 Q2	.121	.104	.023	.709	.041	.047	.042	.011	.011		.064		
1959 Q3	.312	.139	.104	.023	.269	.024	.042	.021	.011	.011			
1959 Q4	.041	.312	.149	.120	.020	.297	.024	.021	.021	.021			
1960 Q1	.375	.041	.349	.149	.080	.020	.294	.020	.021	.021	.021		
1960 Q2	.082	.033	.041	.438	.045	.059	.020	.277	.028	.021	.021		
1960 Q3	.082	.496	.033	.041	.167	.028	.059	.020	.028	.034	.021		
1960 Q4	.082	.082	.496	.033	.020	.167	.018	.062	.028	.034	.021		
1961 Q1	.084	.082	.082	.496	.033	.167	.018	.062	.059	.034	.034		
1961 Q2	.109	.142	.082	.496	.033	.020	.130	.018	.012	.032	.034	.034	.034
1961 Q3	.191	.109	.142	.082	.516	.016	.020	.042	.012	.032	.032	.034	.034
1961 Q4	.191	.109	.109	.142	.011	.412	.016	.020	.012	.012	.012	.013	.034

TABLE 6 (Continued)
Food and Beverages (Continued)

YEAR	LAGS IN QUARTERS												
	0	1	2	3	4	5	6	7	8	9	10	11	12
1962 Q1	.029		.191	.151	.107		.011	.412	.016				
1962 Q2	.451	.029		.191	.060	.106	.011	.011	.017			.012	
1962 Q3	.225	.469	.029		.031	.060	.106						
1962 Q4	.014	.225	.493	.029		.031	.106	.106					
1963 Q1	.073	.032	.260	.502	.018	.031	.019	.019	.057				
1963 Q2	.138	.095	.032	.291	.410	.018	.031	.031					
1963 Q3	.066	.157	.118	.032	.066	.018	.018	.018					
1963 Q4	.182	.066	.165	.118	.019	.066	.401	.018					
1964 Q1		.182	.066	.215	.128	.019	.066	.392	.020				
1964 Q2	.247		.182	.087	.128	.107	.019	.035	.033	.020			
1964 Q3	.290	.356		.182	.047	.125	.099	.019	.035	.033	.020		
1964 Q4	.020	.290	.356			.047	.117	.099	.019	.035	.020		
1965 Q1	.041	.020	.290	.390		.107	.117	.099	.019	.035	.020		
1965 Q2	.128	.062	.038	.383	.387	.125	.117	.099	.019	.035	.020		
1965 Q3	.293	.146	.062	.038	.094	.047	.047	.066	.015	.015			
1965 Q4	.030	.300	.154	.062	.017	.300	.094	.066	.015	.015			
1966 Q1	.028	.042	.370	.200	.067	.017	.094	.266	.016	.034	.034		
1966 Q2	.201	.028	.042	.552	.108	.076	.094	.266	.022	.034	.034		
1966 Q3	.285	.201	.047	.051	.259	.108	.076		.022				
1966 Q4	.142	.313	.204	.047	.021	.108	.076	.076					
1967 Q1	.043	.142	.313	.204	.056	.261	.100	.088	.079				
1967 Q2	.070	.043	.201	.510	.143	.022	.264	.093	.076	.049			
1967 Q3	.172	.092	.043	.236	.254	.056	.022	.013	.093	.059	.049		
1967 Q4		.172	.097	.043	.109	.143	.037	.013	.093	.059	.049		
1968 Q1	.021		.172	.097	.041	.226	.140	.037	.013	.095	.049		
1968 Q2	.094	.021		.344	.082	.109	.226	.140	.049	.095	.049		
1968 Q3	.128	.094	.021		.172	.041	.079	.133	.133	.021	.049		
1968 Q4	.113	.128	.094	.021		.077	.041	.044	.043	.021	.049		.010
						.172	.078	.041	.043	.021	.049		
						.172	.078	.041	.043	.021	.049		

TABLE 6 (Continued)
WEIGHTS FOR MOVING AVERAGES

Rubber

YEAR	LAGS IN QUARTERS											
	0	1	2	3	4	5	6	7	8	9	10	11
1955 Q1	.531											
1955 Q2	.442	.531										
1955 Q3		.442	.531									
1955 Q4			.442	.531								
1956 Q1	.692	.692	.692	.531								
1956 Q2	.210	.210	.692	.442								
1956 Q3		.692	.210									
1956 Q4			.210	.692								
1957 Q1	.686	.686	.686	.686								
1957 Q2	.079	.079	.079	.686								
1957 Q3	.237	.237	.334	.079								
1957 Q4		.249	.334	.686								
1958 Q1	.249	.144	.249	.334								
1958 Q2	.144	.306	.144	.079								
1958 Q3	.306	.306	.306	.334								
1958 Q4		.413	.306		.097							
1959 Q1	.413	.396	.413	.249								
1959 Q2	.396	.396	.396	.144								
1959 Q3	.074	.413	.396	.306								
1959 Q4	.394	.396	.413	.413								
1960 Q1	.315	.231	.305	.549								
1960 Q2		.394	.394									
1960 Q3		.315	.315	.305								
1960 Q4			.315	.394								
1961 Q1	.768	.768	.768	.315	.153							
1961 Q2	.169	.169	.768	.394	.231							
1961 Q3			.169	.315	.231							
1961 Q4				.315	.231	.153						

TABLE 6 (Continued)
WEIGHTS FOR MOVING AVERAGES
Textiles

YEAR	LAGS IN QUARTERS												
	0	1	2	3	4	5	6	7	8	9	10	11	12
1956 Q1	.672	.099		.084									
Q2	.544	.099											
Q3	.175	.672		.099									
Q4	.544	.544		.672	.061								
1957 Q1	.175	.175		.544		.061							
Q2	.085	.085		.175	.371		.061						
Q3	.160	.085		.544				.061					
Q4	.045	.160		.175	.371								
1958 Q1	.045	.045		.085	.106	.453		.453					
Q2	.066	.045		.213	.052		.453		.082				
Q3	.057	.066		.059	.015	.106							
Q4	.130	.066		.066	.015	.106		.106					
1959 Q1	.108	.057			.052	.106		.106					
Q2	.179	.130		.066	.015	.105		.052	.106				
Q3	1.179	.108		.057		.015		.030	.052	.106			
Q4	.141	.141		.130	.066			.030	.030	.106			
1960 Q1	.090	.090		1.179	.066								
Q2	.207	.210		1.179	.042	.066							
Q3	.097	.210		.169	.108	.042	.066						
Q4	.207	.207		.141	.318	.108	.042	.066					
1961 Q1	.097	.207		.141	.141	.318	.108	.042	.106				
Q2	.452	.097		.210	.120	.057	.066	.066	.066				
Q3	.165	.031		.207	.120	.120	.042	.042	.042				
Q4	.152	.452		.097	.021	.150	.108	.108	.108				
1962 Q1	.165	.452		.031	.049	.150	.318	.318	.318				
Q2	.152	.165		.031	.021	.021	.029	.029	.029				
Q3	.152	.165		.031	.049	.021	.150	.150	.058				

TABLE 6 (Continued)

Textiles (Continued)

YEAR	LAGS IN QUARTERS												
	0	1	2	3	4	5	6	7	8	9	10	11	12
1963 Q1		.085	.152	.165	.282	.031	.049	.021		.150		.058	
Q2			.085	.152	.137	.282	.031	.049	.031				.058
Q3	.037			.085	.083	.137	.282	.031		.031			
Q4	.154	.037			.068	.083	.137	.282	.076		.031		
1964 Q1	.107	.154				.068	.083	.137		.046			
Q2	.503	.107	.073				.068	.083			.046		
Q3	.170	.503	.176		.037			.083				.031	
Q4	.169	.170	.107		.131	.037		.068				.046	
1965 Q1	.125	.169	.503	.696	.084	.131	.037						
Q2		.125	.324	.170	.193	.084	.131	.037					
Q3			.125	.354	.063	.193	.084	.131	.037				
Q4				.125	.185	.084	.193	.084	.022	.037			
1966 Q1	.327				.094	.185	.084	.084	.022	.022	.037		
Q2		.327				.094	.204	.084		.022	.022		
Q3	.351	.327				.094	.204	.204	.021				
Q4	.029	.102	.327				.094	.094	.204	.062			
1967 Q1		.102	.518	.646						.204			
Q2			.102	.518	.405					.062			
Q3				.124	.239	.405					.030		
Q4					.116	.239	.405				.062		
1968 Q1	.120	.120				.043	.405	.313				.062	
Q2	.109	.109	.187				.293	.293	.227				

TABLE 6 (Continued)
WEIGHTS FOR MOVING AVERAGES
Clothing

YEAR	LAGS IN QUARTERS													
	0	1	2	3	4	5	6	7	8	9	10	11	12	13
1955 Q1	.056													
1955 Q2		.056												
1955 Q3			.056											
1955 Q4				.102										
1956 Q1	.081		.056	.199										
1956 Q2	1.293	.183	.056	.153										
1956 Q3		1.293	.183	.199	.153									
1956 Q4			1.293	.183	.199	.153								
1957 Q1	.161		1.293	.183	.199	.153								
1957 Q2	.074	.161	1.293	1.293	.101	.051								
1957 Q3	.221	.303	.161	1.293	.101									
1957 Q4		.221	.303	.161	.101									
1958 Q1	.142	.142	.221	.303										
1958 Q2	.181	.142	.142	.221	.229				.122					
1958 Q3		.181	.142	.142	.142	.032			.122					
1958 Q4			.181	.142	.142	.032	.032		.122					
1959 Q1	.079			.181	.047	.047	.032		.122					
1959 Q2		.184				.047	.032	.032	.122					
1959 Q3			.184			.047	.047	.048	.122					
1959 Q4				.184		.047	.047	.048	.122					
1960 Q1	.039	.142	.085	.184	.105	.053	.088	.088	.048					
1960 Q2	.142	.039	.085	.184	.105	.053	.088	.088	.048	.048				
1960 Q3		.142	.085	.085	.085	.053	.088	.088	.048	.048				
1960 Q4			.142	.085	.085	.053	.088	.088	.048	.048				
1961 Q1			1.368	.085	.085	.053	.088	.088	.048	.048				
1961 Q2			.142	1.368	.085	.085	.053	.088	.048	.048				
1961 Q3			.132	.189	.085	.085	.053	.088	.048	.048				
1961 Q4				.132	1.329	.085	.053	.088	.048	.048				.035

TABLE 6 (Continued)

Clothing (Continued)

YEAR	LAGS IN QUARTERS													
	0	1	2	3	4	5	6	7	8	9	10	11	12	13
1962 Q1					.132	.047	.016							
Q2		.096			.132	.132	.047	.016						
Q3	.094	.390	.096			.132	.047	.016						
Q4	.060	.234	.390	.147						.016				
1963 Q1	.102	.091	.234	.390	.147									
Q2	.127	.102	.091	.234	.390	.147								
Q3		.127	.102	.091	.140		.147							
Q4		.637	.127	.102	.031			.096						
1964 Q1			.637	.127	.102	.014		.096						
Q2		.466		.637	.102	.102	.014	.044						
Q3	.108	.108	.466		1.274	1.274	.102	.014	.025	.044				
Q4	.091	.091	.108	.466	.466	1.274	.102	.102	.052	.044	.044			
1965 Q1	.053	.053	.108	.108	.466		.637	.637	.052	.011	.044			
Q2	.105	.053	.091	.108					.052	.052	.011	.044		
Q3	.105	.105	.053	.163	.466				.052	.052	.011	.044		
Q4	.110	.105	.053	.053	.071				.052	.052	.011	.044		
1966 Q1	.110	.110	.105	.053	.071	.071								
Q2	.565	.110	.110	.105	.017	.017	.071							
Q3		.565	.110	.110	.111	.111	.017	.097						
Q4		.565	.565	.110	.111	.111	.017	.017	.097					
1967 Q1				.565			.111	.111	.097	.097				
Q2					.423	.423	.111	.111	.097	.097				
Q3	.145	.268	.268	.268			.111	.111	.097	.097				
Q4	.050	.145	.145	.268	.423	.423	.111	.111	.097	.097	.097			
1968 Q1	.434	.050	.145	.268	.268	.423	.423	.423	.083	.083	.097	.097		
Q2	.434	.050	.100	.145	.079	.102	.423	.423	.083	.083	.097	.097	.009	
Q3		.434	.434	.137	.079	.079	.102	.423	.423	.083	.083	.097	.009	
Q4			.434	.137	.079	.079	.102	.423	.423	.083	.083	.097	.009	.083

TABLE 6 (Continued)

Wood Products (Continued)

YEAR	LAGS IN QUARTERS													
	0	1	2	3	4	5	6	7	8	9	10	11	12	
1962 Q1														
1962 Q2						.081	.033							
1962 Q3						.081	.033							
1962 Q4	1.045							.033						
1963 Q1		1.045												
1963 Q2			1.045											
1963 Q3				1.880										
1963 Q4					.955									
1964 Q1						.955								
1964 Q2							.955							
1964 Q3								.955						
1964 Q4	1.031								.120					
1965 Q1		1.031												
1965 Q2			1.069											
1965 Q3				1.929										
1965 Q4					.898									
1966 Q1						.898								
1966 Q2							.973							
1966 Q3								.112						
1966 Q4	.806								.150					
1967 Q1		.806								.225				
1967 Q2			.806								.112			
1967 Q3				1.613								.112		
1967 Q4	.069				.806								.112	
1968 Q1		.069				.806								.075
1968 Q2	.176		.069				.806							
1968 Q3	.822	.176		.107				.038						
1968 Q4		.822	.176						.038					

TABLE 6 (Continued)

WEIGHTS FOR MOVING AVERAGES

Paper

YEAR	LAGS IN QUARTERS											
	0	1	2	3	4	5	6	7	8	9	10	11
1955 Q1				.088		.104		.017				
1955 Q2	.696											
1955 Q3	.213	.714										
1955 Q4	.016	.213	.737									
1956 Q1		.016	.213	.737								
1956 Q2	.980	1.000	.016	.213	.041	.024	.026					
1956 Q3				.016	.113	.113	.113					
1956 Q4				1.000	.581	.574	.044	.044				
1957 Q1	.121	.121	.121	1.000			.026	.026				
1957 Q2	.033	.033	.033				.113	.113				
1957 Q3												
1957 Q4											.018	.018
1958 Q1	.182	.182	.121	.121			.574	.574				
1958 Q2	.243	.033	.033	.033					.013			
1958 Q3	.106	.243	.238	.033								
1958 Q4	.926	.106	.243	.238	.010	.010						
1959 Q1	.119	.926	.106	.251	.056	.056	.010	.010				
1959 Q2		.119	.926	.106	.016	.016						
1959 Q3	.090	.104	.119	.926			.016	.016				
1959 Q4	.172	.090	.104	.119								
1960 Q1		.172	.090	.104	.104	.035		.008				
1960 Q2	.365		.223	.090	.104							
1960 Q3	.108	.465	.223	.223			.035					
1960 Q4	.047	.137	.592	.223	.102	.102		.035				
1961 Q1	.029	.047	.137	.595					.035			
1961 Q2	.025	.029	.047	.137	.244	.102	.051					
1961 Q3	.443	.025	.029	.064	.030	.143	.051	.051				
1961 Q4	.344	.451	.028	.029	.017		.016					

TABLE 6 (Continued)

Paper (Continued)

YEAR	LAGS IN QUARTERS											
	0	1	2	3	4	5	6	7	8	9	10	11
1962	Q1	.360	.451	.028		.017	.017	.014				
	Q2	.055	.554	.451	.015		.017		.014			
	Q3	.428	.055	.554	.015		.015			.014		
	Q4	.237	.428	.055	.210		.011				.014	
1963	Q1	.075	.237	.428	.028	.194	.023	.011				.014
	Q2	.061	.089	.281	.155		.032	.023				
	Q3	.179	.089	.089	.044		.032		.015			
	Q4	.041	.179	.041	.014		.044	.032		.015		
1964	Q1		.041	.179	.132	.014	.044	.032				
	Q2	.062	.081	.081	.041		.014	.032				
	Q3	.185	.185	.185	.132		.015			.015		
	Q4	.104	.104	.104	.041		.041	.015				
1965	Q1		.104	.185	.104	.171	.041	.015				
	Q2	.058	.104	.104	.104		.049	.041	.015			
	Q3	.422	.206	.206			.049					
	Q4	.289	.449	.449			.049					
1966	Q1		.449	.449	.217				.049			
	Q2	.023	.681	.713	.196							
	Q3	.151	.491	.497	.319		.049					
	Q4	.023	.023	.497	.390		.523	.060				
1967	Q1		.023	.023	.023	.023	.237	.049				
	Q2	.026	.151	.151	.151	.023	.300	.049	.011			
	Q3	.058	.023	.023	.031	.151	.208	.302	.498	.023		
	Q4	.011	.058	.026	.031	.008	.042	.385	.209	.274	.011	
1968	Q1	.011	.058	.058	.030	.008	.151	.042	.151	.222	.274	.011

TABLE 6 (Continued)
WEIGHTS FOR MOVING AVERAGES

Printing

YEAR	LAG IN QUARTERS														
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1955 Q1	.077	.089	.245	.577											
1955 Q2	.135	.077	.089	.245	.256										
1955 Q3	.289	.135	.077	.089	.064	.117									
1955 Q4	.289	.135	.135	.441	.089	.064	.117								
1956 Q1	.214	.289	.289	.135	.364	.089	.364	.089							
1956 Q2	.273	.214	.214	.289	.072	.364	.089	.089							
1956 Q3		.373	.214	.214	.072	.364	.089								
1956 Q4		.373	.529	.214	.072	.364	.089								
1957 Q1	.287	.287	.629	.629	.357	.072	.072	.072							
1957 Q2		.287	.287	.287	.357	.072	.072	.072							
1957 Q3			.287	.287	.357	.256	.281	.180							
1957 Q4				.287	.357	.256	.281	.180	.180						
1958 Q1	.119	.119	.119	.239	.314	.314	.314	.314	.180	.180					
1958 Q2	.160	.275	.119	.239	.314	.314	.314	.314	.180	.180					
1958 Q3	.210	.316	.275	.239	.314	.314	.314	.314	.180	.180					
1958 Q4	.262	.316	.316	.275	.119	.119	.119	.314	.180	.180					
1959 Q1	.394	.262	.316	.275	.119	.119	.119	.314	.180	.180					
1959 Q2	.038	.394	.405	.316	.115	.119	.119	.314	.180	.180					
1959 Q3	.038	.394	.394	.405	.105	.119	.119	.314	.180	.180					
1959 Q4	.073	.038	.038	.394	.262	.119	.119	.314	.180	.180					
1960 Q1	.124	.073	.101	.101	.186	.262	.262	.334	.298	.298					
1960 Q2	.128	.288	.155	.201	.063	.186	.186	.334	.298	.298					
1960 Q3		.128	.288	.201	.128	.095	.095	.222	.036	.036					
1960 Q4		.171	.171	.288	.288	.128	.128	.222	.036	.036					
1961 Q1	.353	.506	.171	.171	.100	.124	.124	.032	.032	.032	.083				
1961 Q2		.506	.171	.171	.100	.124	.124	.032	.032	.032	.083				
1961 Q3			.506	.171	.100	.124	.124	.032	.032	.032	.083				
1961 Q4				.506	.100	.100	.057	.124	.091	.091	.083				

TABLE 6 (Continued)

WEIGHTS FOR MOVING AVERAGES

Metals

YEAR	LAGS IN QUARTERS														
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1955	Q1	.227	.140	.076	.080	.023	.023	.023							
	Q2	.119	.366	.226	.140	.028	.020	.023							
	Q3	.311	.127	.368	.226	.017	.020	.005	.005						
	Q4	.082	.311	.127	.372	.043	.020	.006	.005	.005					
1956	Q1	.133	.090	.311	.129	.148	.043	.006	.006	.006					
	Q2	.056	.133	.092	.311	.043	.009	.078	.006	.006					
	Q3	.333	.063	.225	.098	.126	.040	.007	.078	.006	.006				
	Q4	.170	.338	.065	.229	.018	.126	.040	.004	.034	.034	.006	.006		
1957	Q1	.120	.184	.338	.076	.113	.010	.126	.038	.034					
	Q2	.064	.125	.195	.454	.037	.113	.008	.126	.005					
	Q3	.126	.064	.127	.270	.280	.037	.114	.002	.005					
	Q4	.145	.126	.064	.158	.139	.280	.035	.113	.096					
1958	Q1	.012	.148	.126	.064	.049	.152	.280	.025	.096					
	Q2	.015	.012	.148	.131	.038	.045	.141	.169	.008					
	Q3	.027	.015	.012	.151	.057	.038	.043	.067	.029	.001				
	Q4	.363	.027	.021	.012	.016	.057	.038	.016	.034	.029	.001			
1959	Q1	.373	.364	.030	.021	.003	.013	.057	.038	.004	.029	.001			
	Q2	.110	.384	.375	.030	.006	.003	.013	.052	.013	.018	.025			
	Q3	.037	.118	.392	.499	.006	.006	.003	.013	.030	.013	.018	.006		
	Q4	.059	.037	.121	.530	.234	.026	.003	.003	.029	.013	.018	.011		
1960	Q1	.036	.059	.037	.137	.267	.238	.024	.027	.003	.029	.013			
	Q2	.022	.036	.064	.037	.058	.258	.229	.027	.030	.003	.029	.003		
	Q3	.034	.022	.036	.073	.062	.052	.279	.271	.030	.003	.029	.003		
	Q4	.070	.034	.022	.040	.035	.062	.049	.252	.245	.010	.003	.003		
1961	Q1	.026	.070	.034	.022	.021	.035	.062	.050	.243	.010	.003	.003	.003	
	Q2	.103	.031	.070	.045	.019	.021	.030	.062	.045	.241	.006	.006	.003	
	Q3	.040	.119	.031	.070	.011	.019	.021	.034	.028	.254	.076	.076	.003	
	Q4	.174	.040	.137	.035	.091	.011	.019	.029	.028	.043	.144	.144	.004	

TABLE 6 (Continued)

Metals (Continued)

YEAR	LAGS IN QUARTERS														
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1962 Q1	.320	.336	.040	.152	.023	.091	.011	.019	.031	.028	.028	.026	.003		
Q2	.096	.320	.336	.040	.096	.023	.090	.010		.031	.030	.028			
Q3	.049	.096	.343	.336	.038	.090	.027	.090	.010		.031	.017			
Q4	.051	.049	.130	.413	.297	.038	.090	.023		.010		.018	.002		
1963 Q1	.054	.051	.055	.130	.148	.136	.038	.092	.022	.010	.010			.002	
Q2	.019	.054	.057	.076	.062	.148	.136	.038	.102	.017	.010				
Q3	.088	.019	.086	.057	.031	.062	.253	.213	.098	.098	.013				
Q4	.004	.091	.025	.089	.034	.031	.059	.253	.196	.098	.085	.013			
1964 Q1	.024	.004	.091	.034	.062	.034	.026	.059	.226	.196	.196	.068			
Q2	.093	.024	.004	.109	.016	.062	.034	.024	.055	.226	.196	.012			
Q3	.058	.099	.042	.004	.176	.017	.030	.042	.024	.055	.098	.119			.006
Q4	.234	.058	.120	.051	.006	.174	.018	.041	.020	.024	.025	.029			
1965 Q1	.428	.383	.088	.168	.031	.006	.174	.015	.022	.020	.024	.025			
Q2	.141	.470	.383	.093	.087	.031	.006	.172	.015	.022	.014	.005			
Q3	.072	.141	.551	.383	.034	.090	.013	.006	.073	.014	.022	.007			
Q4	.074	.072	.153	.639	.288	.039	.079	.004	.005	.073	.007	.008			
1966 Q1	.013	.074	.082	.159	.219	.139	.015	.060	.005	.005	.073	.057			
Q2	.057	.013	.077	.100	.069	.179	.139	.015	.048	.005	.005	.057			
Q3	.304	.057	.013	.091	.030	.069	.098	.139	.015	.039	.005	.057			
Q4	.126	.308	.064	.013	.031	.030	.064	.106	.126	.015	.029	.005			
1967 Q1	.036	.133	.309	.077	.004	.037	.028	.066	.102	.126	.009	.005			
Q2	.042	.036	.133	.323	.031	.004	.037	.024	.063	.102	.126	.004			
Q3	.016	.049	.041	.169	.165	.031	.004	.026	.025	.063	.102	.126	.004		
Q4	.003	.030	.049	.054	.145	.165	.028	.004	.020	.025	.056	.006	.004		
1968 Q1	.451	.003	.034	.080	.020	.138	.163	.019	.002	.015	.017	.048	.003		

TABLE 6 (Continued)
WEIGHTS FOR MOVING AVERAGES
Chemicals

YEAR	LAGS IN QUARTERS											
	0	1	2	3	4	5	6	7	8	9	10	11
1955 Q1	.052	.412	.186	.096								
1955 Q2	.071	.052	.412	.186		.128						
1955 Q3	.236	.106	.052	.412	.128							
1955 Q4	.070	.290	.141	.052	.204	.128						
1956 Q1	.072	.070	.290	.141	.071	.204	.032					
1956 Q2	.068	.072	.070	.290	.055	.204	.120					
1956 Q3	.307	.188	.072	.070	.072	.035	.204					
1956 Q4	.237	.307	.188	.072	.048		.204					
1957 Q1	.183	.237	.307	.188	.119	.048						
1957 Q2	.064	.183	.306	.399	.092	.048						
1957 Q3	.197	.064	.233	.306	.115	.092	.048					
1957 Q4	.069	.197	.064	.233	.091	.115	.092	.048				
1958 Q1	.241	.069	.197	.064	.091	.091	.083	.048				
1958 Q2	.068	.241	.069	.197	.055	.091	.083	.083				
1958 Q3	.068	.068	.264	.069	.055	.055	.041	.083				
1958 Q4	.183	.068	.068	.264	.052	.055	.041	.083				
1959 Q1	.224	.183	.068	.293	.052	.052	.055	.055	.083			
1959 Q2	.470	.224	.183	.068	.068	.052	.055	.055	.083	.046		
1959 Q3	.112	.470	.224	.183	.044	.029	.029	.055	.046	.046		
1959 Q4	.123	.112	.470	.224	.189	.044	.029	.055	.046	.046		
1960 Q1	.042	.154	.112	.470	.046	.044	.044	.055	.046	.046		
1960 Q2	.214	.042	.154	.112	.189	.044	.044	.055	.046	.046		
1960 Q3	.147	.214	.042	.154	.121	.189	.044	.055	.046	.046		
1960 Q4	.152	.147	.214	.042	.128	.121	.189	.055	.046	.046		
1961 Q1	.055	.152	.147	.090	.049	.097	.172	.188	.188	.188		
1961 Q2	.167	.055	.147	.214	.049	.097	.172	.188	.188	.188		
1961 Q3	.167	.167	.152	.147	.098	.049	.121	.188	.188	.188		
1961 Q4	.262	.167	.055	.152	.098	.049	.121	.188	.188	.188	.063	

TABLE 6 (Continued)

Chemicals (Continued)

YEAR	LAGS IN QUARTERS											
	0	1	2	3	4	5	6	7	8	9	10	11
1962 Q1	.053	.262	.167	.055	.152	.098						.063
1962 Q2	.054	.053	.262	.167	.039	.152	.098					
1962 Q3	.064	.054	.053	.384	.097	.039	.152	.098				
1962 Q4	.064	.064	.108	.099	.122	.097	.039	.152	.062			
1963 Q1	.316	.064	.064	.108	.046	.122	.039	.039	.062			
1963 Q2	.168	.316	.064	.064	.054	.046	.097	.097				
1963 Q3	.072	.195	.316	.316	.054	.275	.153	.153	.153	.062		.062
1963 Q4	.348	.072	.195	.316	.046	.046	.153	.153				
1964 Q1	.208	.348	.072	.291	.118					.153		
1964 Q2	.208	.348	.348	.072	.124	.118				.153	.153	
1964 Q3	.112	.208	.208	.348	.036	.096	.118					
1964 Q4	.139	.139	.208	.348	.323	.036	.096	.118				
1965 Q1	.084	.084	.192	.234	.106	.323	.036	.036	.088			
1965 Q2	.100	.100	.192	.219	.142	.106	.323	.036	.036	.088		
1965 Q3		.100	.084	.138	.142	.142	.106	.036	.036	.088	.088	
1965 Q4	.131	.100	.100	.100	.089	.142	.106	.036	.036	.036	.088	.088
1966 Q1	.116	.131	.131	.138	.089	.089	.089	.062	.062	.036	.036	.088
1966 Q2	.541	.116	.131	.100	.089	.089	.089	.062	.027	.036	.036	.036
1966 Q3	.180	.541	.116	.131	.083	.089	.089	.089				
1966 Q4	.180	.180	.541	.142	.048	.083	.089	.089				
1967 Q1	.032	.313	.313	.799	.048	.083	.089	.089	.054			
1967 Q2	.032	.032	.032	.313	.321	.048	.083	.089	.054	.054		
1967 Q3	.097	.097	.032	.032	.188	.048	.083	.083	.054	.054	.054	
1967 Q4	.059	.097	.097	.032	.188	.321	.083	.083	.054	.054	.054	
1968 Q1	.155	.059	.059	.097	.032	.188	.321	.057	.034	.054	.054	
1968 Q2	.378	.155	.059	.097	.032	.055	.062	.062	.034	.034	.054	
1968 Q3	.314	.378	.175	.059	.097	.032	.055	.055	.034	.034	.054	.054

TABLE 6 (Continued)
Electrical Products (Continued)

YEAR	LAG IN QUARTERS																	
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1962 Q1	.092	.275	.045	.350	.019	.145	.043	.013			.021							
1962 Q2	.338	.092	.285	.045	.077	.019	.145				.021							
1962 Q3	.098	.344	.092	.285	.045	.077	.019	.065										
1962 Q4	.055	.114	.344	.117	.061	.045	.077	.019	.065									
1963 Q1	.065	.114	.065	.396	.037	.061	.045	.053	.065									
1963 Q2	.416	.065	.114	.114	.075	.037	.050	.058	.065									
1963 Q3	.038	.416	.065	.065	.048	.092	.044	.050	.034	.065								
1963 Q4	.153	.038	.426	.065	.051	.052	.092	.020	.050	.034	.065							
1964 Q1	.024	.153	.038	.649	.051	.052	.052	.040	.050	.034	.065							
1964 Q2	.320	.024	.153	.038	.233	.053	.053	.052	.057	.050	.065		.012					
1964 Q3	.078	.341	.024	.153	.038	.233	.053	.052	.057	.050	.065		.012					
1964 Q4	.063	.078	.341	.024	.138	.038	.223	.065	.024	.050	.065		.012					
1965 Q1	.041	.063	.063	.103	.067	.165	.067	.138	.038	.037	.037		.050					
1965 Q2	.383	.058	.406	.063	.031	.165	.067	.138	.038	.037	.037		.007					
1965 Q3	.105	.134	.559	.076	.067	.165	.067	.138	.038	.037	.037		.007					
1965 Q4	.173	.406	.065	.063	.031	.165	.067	.138	.038	.037	.037		.035					
1966 Q1	.046	.190	.178	.559	.102	.031	.067	.165	.024	.106	.106		.037					
1966 Q2	.063	.046	.190	.076	.031	.031	.067	.165	.024	.106	.106		.012					
1966 Q3	.049	.063	.178	.190	.189	.085	.031	.031	.043	.104	.106		.037					
1966 Q4	.049	.063	.046	.190	.120	.165	.078	.036	.036	.036	.106		.036					
1967 Q1	.432	.049	.095	.069	.017	.091	.012	.044	.081	.083	.083		.083					
1967 Q2	.286	.432	.049	.118	.043	.015	.047	.012	.012	.036	.036		.036					
1967 Q3	.040	.322	.049	.107	.055	.043	.047	.018	.044	.044	.044		.036					
1967 Q4	.055	.582	.612	.633	.058	.055	.043	.015	.044	.044	.044		.044					
1968 Q1	.156	.016	.582	.582	.347	.055	.023	.047	.018	.018	.018		.044					
1968 Q2		.083	.083	.582	.347	.083	.023	.047	.027	.018	.018		.018					

TABLE 6 (Continued)

WEIGHTS FOR MOVING AVERAGES

Non-Metallic Mineral Products

YEAR	LAGS IN QUARTERS													
	0	1	2	3	4	5	6	7	8	9	10	11	12	
1955 Q1			.246	.054										
1955 Q2	.346			.246										
1955 Q3	.494	.346												
1955 Q4	.494	.494	.346											
1956 Q1	.270	.270	.346	.346										
1956 Q2	.575	.494	.494	.494	.032									
1956 Q3		.270	.270	.270	.032	.032								
1956 Q4		.575	.575	.575	.032	.032	.032							
1957 Q1	.068	.068	.068	.270	.075	.032	.032	.032						
1957 Q2	.451	.068	.068	.575	.075	.075	.075	.032						
1957 Q3	.036	.451	.068			.075	.075							
1957 Q4	.113	.036	.451				.075							
1958 Q1	.165	.113	.054	.068										
1958 Q2	.549	.165	.054	.451	.049			.075						
1958 Q3		.549	.113	.054	.049	.049		.075	.172					
1958 Q4	.110		.165	.113	.018	.049	.049	.049	.172	.172				
1959 Q1	.072	.110	.549	.214	.049	.018	.049	.049	.172	.172	.172			
1959 Q2	.260	.072	.110	.549	.049	.049	.049	.049						
1959 Q3	.284	.260	.072	.110		.049	.049							
1959 Q4	.177	.284	.072	.110	.110	.049	.049							
1960 Q1	.251	.177	.284	.072	.110	.110	.049							
1960 Q2	.109	.251	.177	.349	.072	.110	.049							
1960 Q3	.118	.109	.251	.177	.253	.072	.110							
1960 Q4		.118	.109	.177	.103	.253	.072	.110						
1961 Q1	.073	.177	.109	.251	.078	.103	.072	.072						
1961 Q2	.057	.177	.177	.109	.103	.078	.072	.103	.103					
1961 Q3		.339	.339	.177	.109	.078	.078	.103	.078					
1961 Q4		.114	.339	.177	.059	.109	.078	.078	.065					

TABLE 6 (Continued)
Non-Metallic Mineral Products (Continued)

YEAR	LAGS IN QUARTERS												
	0	1	2	3	4	5	6	7	8	9	10	11	12
1962 Q1	.148	.114	.339	.109	.329	.109	.109	.109	.065	.065	.065		
Q2	.125	.148	.114	.305	.152	.305	.305	.305			.065		
Q3	.581	.125	.148	.095	.092	.095	.095	.305					
Q4	.581	.581	.125	.750	.092	.092	.092	.095	.242				
1963 Q1	.453	.453	.750	.453	.316	.092	.092	.092					
Q2	.052	.052	.453	.521	.316	.075	.075	.092					
Q3	.119	.119	.052	.386	.521	.316	.316	.075	.075				
Q4	.083	.119	.119	.052	.046	.386	.386	.316	.316	.316			
1965 Q1	.083	.083	.171	.052	.046	.046	.386	.386	.318	.316	.316		
Q2	.198	.229	.083	.171	.053	.046	.046	.386	.318	.084	.316	.147	
Q3	.338	.198	.229	.083	.053	.053	.046	.046	.046	.084	.084	.084	
Q4	.338	.338	.229	.083	.074	.074	.046	.046	.046	.084	.084	.084	.084
1966 Q1	.066	.066	.448	.198	.326	.074	.074	.074	.074				
Q2	.171	.171	.448	.198	.059	.277	.277	.074	.277	.181			
Q3	.049	.285	.066	.334	.215	.059	.059	.277	.277	.069			
Q4	.049	.049	.066	.334	.057	.278	.338	.059	.338	.338	.069		
1967 Q1	.095	.084	.084	.084	.035	.057	.057	.338	.338	.069	.069	.069	
Q2	.101	.196	.196	.084	.257	.257	.143	.057	.338	.323	.308	.069	
Q3	.101	.095	.196	.196	.035	.035	.154	.057	.057	.323	.308	.069	
Q4	.240	.101	.095	.095	.253	.154	.154	.094	.338	.323	.308	.197	.092

TABLE 6 (Continued)

WEIGHTS FOR MOVING AVERAGES

Total Manufacturing

YEAR	LAG IN QUARTERS																			
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17		
1955	.118	.161	.109	.082	.049	.019	.018	.002												
Q2	.190	.173	.164	.109	.007	.030	.002	.009												
Q3	.263	.197	.173	.183	.031	.006	.027		.002											
Q4	.059	.272	.202	.183	.068	.025	.006	.027		.002										
1956	.115	.068	.272	.204	.076	.054	.023	.004	.019											
Q2	.257	.115	.071	.359	.027	.022	.065	.023	.003	.018										
Q3	.332	.275	.153	.074	.162	.022	.021	.046			.002									
Q4	.101	.334	.294	.154	.020	.154	.020	.012	.016			.002								
1957	.094	.109	.335	.305	.047	.011	.154	.019		.013										
Q2	.092	.096	.117	.388	.135	.047	.011	.067	.008											
Q3	.180	.106	.099	.153	.184	.125	.048	.008		.005										
Q4	.078	.182	.106	.112	.072	.188	.125	.047	.006		.002									
1958	.060	.087	.185	.124	.033	.075	.188	.114	.039	.006										
Q2	.074	.064	.088	.189	.052	.031	.068	.138	.034	.039	.002									
Q3	.116	.078	.072	.093	.033	.041	.028	.031	.026	.026	.001	.002								
Q4	.274	.118	.081	.076	.020	.033	.041	.017	.016	.023	.022									
1959	.254	.274	.130	.085	.022	.010	.032	.023	.002	.009	.020	.022								
Q2	.081	.263	.282	.132	.014	.019	.010	.028	.013	.002	.008	.019	.016							
Q3	.080	.098	.274	.329	.054	.010	.012	.009	.015	.013	.001	.008	.002	.016						
Q4	.156	.087	.100	.328	.103	.063	.012	.007	.005	.014	.013	.004	.004		.016					
1960	.087	.160	.096	.111	.171	.104	.050	.008	.003	.005	.012	.013	.004			.016				
Q2	.109	.097	.263	.105	.052	.170	.101	.050	.005	.001	.005	.012	.003				.016			
Q3	.051	.138	.102	.271	.062	.037	.170	.117	.017	.005	.001	.001	.001							
Q4	.082	.054	.154	.106	.140	.059	.038	.160	.099	.009	.002	.001	.001							
1961	.034	.090	.146	.157	.046	.137	.049	.035	.118	.099	.009	.002	.001	.001						
Q2	.112	.042	.096	.150	.100	.038	.034	.041	.025	.111	.093	.008	.002	.001	.001					
Q3	.106	.129	.050	.111	.107	.074	.033	.033	.016	.024	.099	.031	.002	.002						
Q4	.138	.108	.137	.052	.077	.103	.058	.034	.014	.012	.020	.056	.002	.002						

TABLE 6 (Continued)

Total Manufacturing (Continued)

YEAR	LAG IN QUARTERS																	
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1962 Q1	.170	.204	.108	.152	.034	.069	.012	.056	.014	.014	.012	.013	.001					
Q2	.170	.179	.228	.111	.072	.033	.070	.012	.006	.012	.014	.012	.001					
Q3	.209	.212	.188	.231	.035	.066	.027	.056	.005	.006	.012	.007						
Q4	.059	.219	.229	.224	.150	.032	.068	.025	.014	.005	.006	.007	.001					
1963 Q1	.046	.064	.225	.234	.097	.085	.034	.060	.014	.014	.004	.004	.001					
Q2	.087	.048	.068	.332	.123	.094	.065	.036	.052	.007	.007	.003						
Q3	.059	.113	.063	.072	.145	.083	.135	.091	.007	.044	.005	.007						
Q4	.050	.060	.117	.064	.035	.138	.080	.126	.087	.007	.036	.005						
1964 Q1	.027	.050	.103	.157	.050	.034	.136	.075	.097	.086	.005	.029						
Q2	.128	.029	.050	.126	.083	.048	.032	.036	.029	.094	.082	.005	.005					
Q3	.195	.188	.037	.052	.179	.065	.035	.036	.019	.027	.043	.052	.003					
Q4	.113	.195	.197	.041	.030	.178	.064	.039	.020	.016	.013	.016	.001					
1965 Q1	.189	.171	.210	.230	.026	.029	.135	.026	.015	.016	.012	.013	.003					
Q2	.113	.208	.180	.320	.152	.023	.029	.122	.014	.015	.014	.005						
Q3	.154	.138	.241	.182	.131	.100	.016	.029	.039	.007	.014	.006						
Q4	.093	.160	.146	.281	.125	.134	.095	.012	.010	.039	.004	.009						
1966 Q1	.031	.115	.210	.168	.106	.067	.133	.075	.002	.010	.039	.002						
Q2	.085	.032	.125	.246	.098	.093	.067	.026	.032	.002	.010	.029	.002					
Q3	.307	.085	.034	.135	.099	.080	.060	.067	.026	.024	.002	.009	.002					
Q4	.069	.311	.088	.035	.085	.128	.077	.065	.059	.034	.020	.002						
1967 Q1	.029	.076	.330	.119	.010	.068	.088	.077	.059	.059	.019	.009	.002					
Q2	.066	.029	.082	.429	.067	.009	.063	.065	.063	.055	.051	.017	.002					
Q3	.074	.090	.035	.102	.234	.067	.008	.078	.089	.057	.055	.049	.010	.002				
Q4	.014	.083	.107	.045	.077	.232	.068	.008	.042	.056	.053	.010	.010	.002				
1968 Q1	.203	.015	.108	.122	.024	.070	.225	.053	.008	.040	.046	.030	.001					

APPENDIX I

DEPENDENT VARIABLES IN THE FORM OF QUARTERLY CHANGES

The argument in this paper has been predicated on the specification of annual overlapping changes in the aggregate wage index for the dependent variable in econometric investigations. Recently, Black and Kelejian¹² have argued for the alternative specification with quarterly changes. As we have shown elsewhere¹³, a general model of wage determination can be postulated for any integral lag h in the sequence of proportional changes $\{(w_t - w_{t-h})/w_{t-h}\}$.

To obtain a model concerning quarterly changes, [A2] must be reformulated in terms of the average quarterly changes in the wage indices for the micro groups. The definition for the scale factor must be adjusted and will be zero on far more occasions. A complete set of weights¹⁴ for each of the industrial sub-sectors is provided in Table 7 under the assumption that this alternative specification is appropriate. A forthcoming paper will examine the choice between the two alternative specifications but two points are worthy of emphasis here. First, different approximations are involved for the alternatives and it is unclear which of these approximations will result in the smaller error. The discussion of Black and Kelejian is either incomplete or incorrect in this context. Second, Aitken estimators must be used for both specifications wherever multi-term contracts and different proportional weights for groups are concerned. Inferential procedures based on the least-squares technique are likely to be very misleading.

TABLE 7 (Continued)
 WEIGHTS FOR MOVING AVERAGES FOR A QUARTERLY CHANGE IN THE DEPENDENT VARIABLE

Clothing

YEAR	LAGS IN QUARTERS											
	0	1	2	3	4	5	6	7	8	9	10	
1955 Q1												
Q2												
Q3	.056											
Q4					.102							
1956 Q1					.199	.051						
Q2	.081											
Q3	1.293	.101										
Q4												
1957 Q1	.161											
Q2	.074											
Q3	.221	.229										
Q4												
1958 Q1	.142	.142										
Q2	.181								.122			
Q3						.032						
Q4												
1959 Q1												
Q2					.047							
Q3	.079											
Q4		.105								.048		
1960 Q1									.088			
Q2												
Q3	.039		.085									
Q4	.142											
1961 Q1			1.329			.053						.035
Q2												
Q3			.132									
Q4				.047								

TABLE 7 (Continued)
 WEIGHTS FOR MOVING AVERAGES FOR A QUARTERLY CHANGE IN THE DEPENDENT VARIABLE
Wood Products

YEAR	LAGS IN QUARTERS									
	0	1	2	3	4	5	6	7	8	9
1955 Q1										
1955 Q2										
1955 Q3	.795				.064		.141			
1955 Q4										
1956 Q1				.795						
1956 Q2	.274									
1956 Q3										
1956 Q4										
1957 Q1										
1957 Q2										
1957 Q3	.759				.209					
1957 Q4										
1958 Q1										
1958 Q2										
1958 Q3										
1958 Q4										
1959 Q1	.140		.093							
1959 Q2										
1959 Q3			.070		.093					
1959 Q4	.767									
1960 Q1					.070					
1960 Q2			.767							
1960 Q3	.044									
1960 Q4	.061									
1961 Q1		.061								
1961 Q2			.044							
1961 Q3				.081						
1961 Q4					.033					

TABLE 7 (Continued)

Paper (Continued)

YEAR	LAGS IN QUARTERS											
	0	1	2	3	4	5	6	7	8	9	10	
1962 Q1	.028	.016										
1962 Q2	.305	.028	.194		.011				.014			
1962 Q3	.237	.124			.008							
1962 Q4	.075											
1963 Q1	.061		.014	.044	.032		.015					
1963 Q2	.041	.118										
1963 Q3												
1963 Q4												
1964 Q1	.062			.041	.015							
1964 Q2	.104	.122										
1964 Q3												
1964 Q4												
1965 Q1	.058				.049							
1965 Q2	.422	.147										
1965 Q3	.289	.027										
1965 Q4		.160										
1966 Q1	.023		.231	.011								
1966 Q2	.151		.042	.032	.038							
1966 Q3	.023			.006	.029							
1966 Q4					.182	.231	.011					
1967 Q1	.026				.023	.006	.008	.034				
1967 Q2	.058			.008	.151		.013	.183	.225	.011		
1967 Q3	.011						.019	.006	.006	.006		
1967 Q4												
1968 Q1				.004						.020	.008	

TABLE 7 (Continued)
 WEIGHTS FOR MOVING AVERAGES FOR A QUARTERLY CHANGE IN THE DEPENDENT VARIABLE

Metals

YEAR	LAGS IN QUARTERS												
	0	1	2	3	4	5	6	7	8	9	10	11	
1955 Q1	.227				.020		.005						
1955 Q2	.119	.139											
1955 Q3	.311	.008	.002		.043								
1955 Q4	.082			.003	.004								
1956 Q1	.133	.007	.002	.002	.033		.034		.006				
1956 Q2	.056			.006	.126	.005							
1956 Q3	.333	.007	.092	.004	.002								
1956 Q4	.170	.005	.002	.011	.017								
1957 Q1	.120	.014	.010	.115	.017								
1957 Q2	.064	.004	.002	.075	.160	.007	.093						
1957 Q3	.126			.031	.040	.005		.003					
1957 Q4	.145			.006	.012	.027							
1958 Q1	.012	.003		.003	.038			.005	.001				
1958 Q2	.015			.006	.051		.000		.019				
1958 Q3	.027			.003	.010	.001		.004	.007	.006			
1958 Q4	.363		.006		.003					.011			
1959 Q1	.373	.002	.003		.004					.013			
1959 Q2	.110	.011	.011	.123	.098	.020		.003	.029				
1959 Q3	.037	.008	.008	.137	.111	.006							
1959 Q4	.059	.003	.003	.016	.031	.002							
1960 Q1	.036		.005	.009	.062	.002	.002	.003					
1960 Q2	.022			.004	.021		.030	.165	.006				.003
1960 Q3	.034			.004	.016			.110	.071				
1960 Q4	.070			.011	.019			.142	.142	.004			
1961 Q1	.026	.005	.001	.011	.019			.026	.026	.003			
1961 Q2	.103	.015	.019	.004	.090			.028	.028				
1961 Q3	.040							.013	.013				
1961 Q4	.174							.015	.015				

TABLE 7 (Continued)

Metals (Continued)

YEAR	LAGS IN QUARTERS											
	0	1	2	3	4	5	6	7	8	9	10	11
1962 Q1	.320	.162		.015	.014				.018			
1962 Q2	.096				.047	.005		.010			.002	
1962 Q3	.049		.023		.038	.010	.004					
1962 Q4	.051		.033	.069	.136		.019					
1963 Q1	.054		.005		.056			.017	.013			
1963 Q2	.019		.006	.021	.029		.128	.077	.056	.006		
1963 Q3	.088		.032		.005		.029	.069	.119			
1963 Q4	.004	.003	.006	.003	.028		.029	.019	.029		.006	
1964 Q1	.024			.010	.027		.006	.008	.025			
1964 Q2	.093			.018				.019	.005			
1964 Q3	.058	.006	.019		.155	.001	.007	.008	.005			
1964 Q4	.234		.021	.009	.006		.007	.014	.007			
1965 Q1	.428	.149	.030	.048	.004			.007	.008			
1965 Q2	.141	.043		.004	.011			.017	.008			
1965 Q3	.072		.081						.057			
1965 Q4	.074		.012	.088	.139		.010					
1966 Q1	.013		.011	.006	.007		.007	.029	.005			
1966 Q2	.057		.003	.018	.051			.004				
1966 Q3	.304			.014	.002							
1966 Q4	.126	.004	.007		.014		.007	.096	.126	.004		
1967 Q1	.036	.007	.001	.013	.004		.008	.008	.003			
1967 Q2	.042			.014	.011		.003	.014	.048	.003		
1967 Q3	.016	.007	.005	.035	.146			.004	.003			
1967 Q4	.003	.014		.013	.103		.004		.008			
1968 Q1	.451		.004	.031	.003			.004	.002			

TABLE 7 (Continued)
 WEIGHTS FOR MOVING AVERAGES FOR A QUARTERLY CHANGE IN THE DEPENDENT VARIABLE

Chemicals

YEAR	LAGS IN QUARTERS									
	0	1	2	3	4	5	6	7	8	
1955 Q1	.052				.096					
1955 Q2	.071					.032				
1955 Q3	.236	.036				.120				
1955 Q4	.070	.055	.035		.204					
1956 Q1	.072									
1956 Q2	.068									
1956 Q3	.307	.119								
1956 Q4	.237									
1957 Q1	.183				.048					
1957 Q2	.064		.069	.092						
1957 Q3	.197		.050							
1957 Q4	.069				.046					
1958 Q1	.241				.041					
1958 Q2			.023				.037			
1958 Q3	.068			.029	.055					
1958 Q4	.183									
1959 Q1	.224									
1959 Q2	.470									.046
1959 Q3	.112									
1959 Q4	.123									
1960 Q1		.032			.044					
1960 Q2	.042				.189					
1960 Q3	.214				.046					
1960 Q4	.147				.121					
1961 Q1	.152			.049	.097			.126		
1961 Q2	.055									.063
1961 Q3	.167									
1961 Q4	.262				.098					

TABLE 7 (Continued)

Chemicals (Continued)

YEAR	LAGS IN QUARTERS									
	0	1	2	3	4	5	6	7	8	
1962	.053				.152					
	.054				.039					
	.064			.122	.097					
			.054	.046						.062
1963	.316						.153			
	.168									
	.072	.028								
	.348									
1964	.208			.096	.118					
	.112	.027			.036					
			.053	.026	.323					
1965	.084			.027	.080					.088
	.100				.035			.027		.036
	.131			.054						
1966	.116				.035					
	.541				.089					
	.180									
			.133	.026	.083			.054		
1967	.032			.259	.023					
					.062					
	.097				.055		.034			
	.059									
1968	.155				.032					.054
	.378									
	.314		.020		.097					

TABLE 7 (Continued)
WEIGHTS FOR MOVING AVERAGES FOR A QUARTERLY CHANGE IN THE DEPENDENT VARIABLE

Electrical Products

YEAR	LAGS IN QUARTERS														
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1955 Q1	.069	.163													
1955 Q2	.271														
1955 Q3		.014													
1955 Q4	.103														
1956 Q1	.387	.039		.007											
1956 Q2	.491		.008												
1956 Q3	.090	.029			.007										
1956 Q4	.048	.154													
1957 Q1	.054	.017	.038												
1957 Q2	.287	.021	.013	.119											
1957 Q3		.016		.015	.038										
1957 Q4	.125			.005	.162										
1958 Q1	.058			.009	.023										
1958 Q2	.122	.016		.161											
1958 Q3	.064				.009	.009									
1958 Q4	.074		.011	.013						.163					
1959 Q1	.568				.016										
1959 Q2	.027	.004	.012		.025	.024									
1959 Q3	.076			.023	.049										
1959 Q4				.384	.036										
1960 Q1	.047	.034	.007		.053				.016						
1960 Q2	.060			.023	.025				.023						
1960 Q3	.019			.025	.011				.023						
1960 Q4	.273			.007	.007				.014						
1961 Q1	.103			.043	.013										
1961 Q2	.282	.024													
1961 Q3	.045								.021						
1961 Q4	.275			.145											

.168

