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LABOR'S SHARE BY SECTOR AND INDUSTRY, 1948-1965

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Using as an operational definition of labor's share of income the ratio of total compensation of employees to income originating in sectors and industries, this study finds that labor's share increased or remained constant in most of the nine sectors (industrial divisions) examined. In the fifty-two industries tested, labor's share increased in twenty nine, remained constant in nineteen, and decreased in four over the period 1947 to 1965. These findings supplement those of Damodar N. Gujarati for the manufacturing sector which were published in the *Review* in October 1969.

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NUMEROUS studies of labor's share in national income have supported the hypothesis that it has been relatively constant over long periods of time. In 1958, however, Robert Solow demurred to the general view in "A Skeptical Note on the Constancy of Relative Shares."[1] He used a technique (here labeled the Solow test) to determine whether the constancy of labor's aggregative share is the result of stability of the components, with offsetting positive and negative intercorrelations, or whether sector constancy masks net positive or negative intercorrelations in components. More recently, Damodar Gujarati extended the Solow analysis by considering short-run shares of labor in the manufacturing sector, using regression techniques to determine the direction and degree of change of labor's share over time.[2] Gujarati concluded that labor's share of income in manufacturing in the period 1949–1964 "exhibited a significant downward trend."

It is the purpose of this investigation to broaden the short-run analysis of labor's share to include industries in other sectors of the economy. No attempt will be made, however, to analyze labor's share at the aggregate economy level. Aggregation tends to mask important shifts among sectors and industries which may either offset or amplify share changes.

To represent labor's share of generated income, a ratio of total labor cost to pretax value added serves as a theoretical bench mark. At the operational level it is only possible to approximate this ratio. Thus in various studies different operational definitions have been specified. For example, Census of Manufactures value-added data are used when the manufacturing sector is under examination.[3] Since the purpose of this study is

[1]Robert Solow, "A Skeptical Note on the Constancy of Relative Shares," *American Economic Review*, Vol. 48, No. 4 (September 1958), pp. 618–631.

[2]Damodar N. Gujarati, "Labor's Share in Manufacturing Industries, 1949–1964," *Industrial and Labor Relations Review*, Vol. 23, No. 1 (October 1969), pp. 65–77.

[3]Solow, "A Skeptical Note on the Constancy of Relative Shares," pp. 618–631; Gujarati, "Labor's Share in Manufacturing Industries, 1948–1964."

to broaden the short-run analysis of relative shares at the industry level, consistent data covering industries in all sectors of the economy are used. The data are taken from the national income accounts by industry published by the Office of Business Economics (OBE), which are the only comprehensive series available.[4]

Definitions in Present Study

The ratio of employee compensation to national income by industry will be used as an operational definition of labor's share. "Compensation of employees" consists of wages, salaries, and supplements. "National income by industry" is the "sum of the factor costs of production."[5]

Income by industry is an incomplete measure of value added. National income by industry is composed of factor costs, while value added includes factor costs plus purchased business services. Consequently, the Census of Manufactures data would seem to approximate better the denominator of the theoretical bench mark. The compensation-of-employees account, however, is closer to the numerator of the bench-mark definition than the Census of Manufactures payroll concept, since payroll does not include employers' social security contributions, employees' pension plans, group insurance, workmen's compensation, and other nonpayroll labor costs. Because total labor cost includes nonpayroll costs, the OBE compensation-of-employees account provides a closer approximation to the total labor-cost concept. Thus if one uses the Census of Manufactures series to develop an operational ratio, the numerator serves as an imperfect proxy for total labor cost. In contrast, the use of OBE data results in a ratio in which the denominator is an imperfect approximation of value added.

It is possible to measure the relative goodness of the alternative specifications by comparing the variance of a ratio of payroll to compensation and of value added to income originating. Table 1 indicates that the value-added/income-originating ratio has over twice the coefficient of variation of the payroll/compensation ratio. This suggests that payroll is a better proxy for compensation than income originating is for value added. Note, however, that both coefficients of variation are less than 6 percent.

Table 1. OBE and Census Data Comparisons, 1948–1964.

	Payroll/ Compensation	*Value Added/ Income Originating*
Variance	.00036	.00493
Standard deviation	.01898	.07018
Coefficient of variation	.022	.056

[4]U. S. Office of Business Economics, The National Income and Product Accounts of the United States, 1929–1965 (Washington: G.P.O., 1966), pp. 18–21, 90–93. Earlier investigations which made use of these data include Edwin Kuh, "Income Distribution and Employment Over the Business Cycle," in J. S. Dusenberry, *et al.*, eds., *The Brookings Quarterly Econometric Model of the United States* (Chicago: Rand McNally and Co., 1965), pp. 227–278; D. Gale Johnson, "The Functional Distribution of Income in the United States, 1850–1952," *Review of Economics and Statistics,* Vol. 36, May 1954, pp. 175–182; Irving B. Kravis, "Relative Income Shares in Fact and Theory," *American Economic Review,* Vol. 49, No. 5 (December 1959), pp. 917–949; Walter S. Measday, "Labor's Share in the National Income," *Quarterly Review of Economics and Business,* Vol. 2, No. 3 (August 1962), pp. 25–34; and Solow, "A Skeptical Note on the Constancy of Relative Shares."

[5]U. S. Department of Commerce, *Annual Survey of Manufactures, 1964–1965* (Washington: G.P.O., 1968), pp. A2–A3, A5.

A comparison of Gujarati's results for the manufacturing sector, based on Census of Manufactures data, with our results, which are based on OBE data, may make it possible to observe differences in findings which are the result of using alternative data series. Solow's use of both the Census of Manufactures and OBE series produced different results, which were a source of his skepticism about the constancy of labor's share.[6] The analysis in Table 1 does not offer a conclusive indication of which series would serve as a better proxy for the bench-mark definition. The OBE series, however, should provide an adequate proxy, since it does measure the factor costs of production, which in turn reflect the incomes of these factors.

The Test Equations

Solow showed that a "low" coefficient of variation over time is not adequate to establish the relative stability of labor's share in a given sector. If some component industries of a sector were negatively correlated to other component industries, the resulting stability of the sector may mask shifts in the components, that is, relatively high-share industries in a sector may have declined in size, while relatively low-share industries increased. Consequently, distributional problems must be approached from the component level by weighting the industries by some base year's weight to remove bias. A component's weight, w, is calculated by dividing income originating in the component by income originating in the sector. The first year in the data series, 1948, was chosen as the base year. The equation for the fixed-weight calculation is

$$(1) \qquad s_b = \sum_{i=1}^{n} w_b s_i,$$

where s_b is the base-year-weighted sector share, w_b the weight in the base year of the ith industry, and s_i the share of wages in the ith industry over time. A current-weighted series, s_c, is also calculated for comparative purposes:

$$(2) \qquad s_c = \sum_{i=1}^{n} w_c s_i.$$

If the industry shares were statistically independent over time, the theoretical variance of the sector would necessarily be

$$(3) \qquad \sigma^2 = \sum_{i=1}^{n} w_i^2 \sigma_i^2,$$

where w_i is the weight (base) of the ith industry and σ_i^2 its variance. Statistical independence, however, cannot be assumed. If the actual variance of labor's share does not differ significantly over time from the theoretical variance, it can be assumed either that positive and negative correlations among the industry shares offset one another or that statistical independence exists. Under such circumstances one logically can assume that the change in a sector share is not a function of net positive or negative intercorrelations among its components. A theoretical variance significantly smaller than the actual variance would indicate primarily positive correlations among the components, while a theoretical variance larger than the actual would indicate predominately negative correlations.[7] It would be desirable to break the industries down even further, weighting component firms to determine if statistical illusion exists at the three-digit SIC level, but the data needed for the weighting procedure do not exist in published form.

Once it has been determined whether statistical illusion exists, further exami-

[6] "A Skeptical Note on the Constancy of Relative Shares," p. 624.

[7] *Ibid.*, p. 622.

nation of sector and industry shares, using Gujarati's regression model, will suggest the direction and degree of change of labor's share over time.[8] In a linear model with time as the independent variable, a statistically significant regression coefficient suggests that labor's share has a trend over time. Gujarati introduced a quadratic term by squaring the time variable to test whether labor's share is increasing or decreasing at an increasing or decreasing rate. The linear and quadratic equations follow.

(4) $s_{it} = a + bt.$

(5) $s_{it} = a + bt + ct^2.$

Let s_{it} be labor's share in the ith industry at time t, where t equals 1 to 18 for the years 1948 through 1965, and a, b, and c are the parameters.

In order to determine whether cyclical variation is being reflected in the trend, another variable is added to the regression equation. The unemployment rate is introduced to see whether labor's share is significantly associated with cyclical movements in the period 1948 to 1965.[9] Such a cyclical relationship might account for an apparent trend element. The test equation is modified thus:

(6) $s_{it} = a + bt + cU.$

(7) $s_{it} = a + bt + ct^2 + dU.$

Results for Sector Labor Shares

Because of the conventions of government accounting practice it was necessary to omit three sectors of the economy from the study. Exclusion of the government and government enterprises sector stems from the accounting definition of government production as being equal to government's wage bill even when government employees are engaged in direct production. The rest of the world sector is not included for the obvious reason that it is marginally relevant to the behavior of income distribution in the United States. The finance, insurance, and real estate sector exhibits extreme variability of product over short periods of time due to the convention of attributing some interest paid to the paying rather than the receiving industries. Tests were run which verified the a priori supposition that results for the sector would not have much meaning.

Weighted labor shares for the nine sectors examined are presented in Table 2. The largest difference between the coefficients of variation, s_b and s_c, is for the agriculture, forestry, and fisheries (a range from 5.8 percent to 7.78 percent). Two sectors, contract construction and electric, gas, and sanitary services, are composed of one industry each, thus resulting in identical current and fixed weighted labor shares for each year and subsequently no difference in coefficients of variation.

The theoretical and actual variances for each sector also are shown in Table 2. They are not significantly different at the .01 level except for manufacturing, where the actual variance is three times the theoretical variance. At the .05 level of significance, the mining and transportation sectors have significantly different actual and theoretical variances. The results are consistent with the hypothesis that for sectors other than manufacturing, mining, and transportation, labor's share over time behaved as if the components of the sector were statistically

[8] "Labor's Share in Manufacturing Industries, 1949–1964," p. 67.

[9] Data on unemployment were obtained from U. S. Bureau of Labor Statistics, *Handbook of Labor Statistics 1969,* Table 62, p. 124. Unemployment data for each sector were used when available. For several industries it was necessary to use the unemployment rate for the narrowest aggregation to which the sector belonged.

Table 2. Labor's Relative Share by Sectors, 1948–1965.

	Agriculture, Forestry, and Fisheries (1)		*Mining (2)*		*Contract Construction (3)*	*Manufacturing (4)*	
Year	*Current Weight*	*Fixed* Weight*	*Current Weight*	*Fixed* Weight*	*Fixed*** Weight*	*Current Weight*	*Fixed* Weight*
1948	0.1524	0.1524	0.6614	0.6614	0.7010	0.7184	0.7184
1949	0.1861	0.1829	0.7002	0.7237	0.6905	0.7255	0.7219
1950	0.1782	0.1746	0.6672	0.6883	0.7025	0.7023	0.7234
1951	0.1602	0.1569	0.6980	0.7189	0.7364	0.7045	0.7408
1952	0.1653	0.1601	0.7373	0.7696	0.7426	0.7430	0.7411
1953	0.1783	0.1709	0.7671	0.8017	0.7600	0.7595	0.7540
1954	0.1757	0.1664	0.7296	0.7901	0.7755	0.7690	0.7569
1955	0.1857	0.1753	0.7055	0.7606	0.7812	0.7406	0.7438
1956	0.1865	0.1753	0.7095	0.7462	0.7811	0.7635	0.7706
1957	0.1930	0.1818	0.7386	0.7690	0.7732	0.7783	0.7778
1958	0.1749	0.1656	0.7543	0.7871	0.7854	0.8005	0.7775
1959	0.1979	0.1869	0.7952	0.8339	0.7928	0.7721	0.7591
1960	0.1956	0.1849	0.7697	0.8115	0.8070	0.7903	0.7666
1961	0.1888	0.1780	0.7539	0.7875	0.7996	0.7974	0.7695
1962	0.1878	0.1758	0.7745	0.8113	0.8004	0.7894	0.7582
1963	0.1901	0.1775	0.7430	0.7798	0.8044	0.7844	0.7549
1964	0.1947	0.1797	0.7716	0.7964	0.8021	0.7767	0.7607
1965	0.1680	0.1553	0.7488	0.7795	0.8106	0.7634	0.7597
Mean	0.1811	0.1722	0.7347	0.7676	0.7692	0.7599	0.7531
Variance	0.0002	0.0001	0.0013	0.0019	0.0014	0.0009	0.0003
Coefficient of variation	0.0778	0.0580	0.0489	0.0566	0.0486	0.0394	0.0229
Theoretical variance**		0.0001		0.0012	0.0014		0.0001

independent. There definitely seems to be statistical illusion in the manufacturing sector because of interindustry correlations of component shares. The results for manufacturing are partially consistent with the Gujarati study. Gujarati's actual variance is nine times the theoretical variance, while ours is three times.[10] The explanation of the difference in results goes back to the data sources used. If one uses the Census of Manufactures series to develop an operational ratio, the numerator serves as an imperfect proxy for total labor cost. In contrast, the use of OBE data results in an operational ratio in which the denominator is an imperfect approximation of value added. Nevertheless, both studies have manufacturing sectors with positive intercorrelations among component industries.

The results of the tests of equations (4) and (5) for sector aggregates are presented in Table 3. For equation (4) the regression coefficients for all sectors except agriculture, forestry, and fisheries were statistically significant at the .01 level. The signs were positive for all sectors shown in Table 3 except communication and electric, gas, and sani-

[10] "Labor's Share in Manufacturing Industries, 1949–1964," p. 68.

Table 2. (Continued.)

Transportation (5)		*Communication* (6)		*Electric, Gas, and Sanitary Services* (7)	*Wholesale & Retail Trade* (8)		*Services* (9)	
Current Weight	*Fixed* Weight*	*Current Weight*	*Fixed* Weight*	*Fixed*** Weight*	*Current Weight*	*Fixed* Weight*	*Current Weight*	*Fixed* Weight*
0.8099	0.8099	0.8175	0.8175	0.5715	0.6201	0.6201	0.6559	0.6559
0.8241	0.8262	0.7986	0.7988	0.5370	0.6405	0.6418	0.6623	0.6535
0.7844	0.7885	0.7501	0.7498	0.5407	0.6533	0.6531	0.6613	0.6496
0.8045	0.8085	0.7198	0.7192	0.5141	0.6526	0.6514	0.6682	0.6567
0.8124	0.8151	0.7212	0.7206	0.5031	0.6639	0.6629	0.6716	0.6600
0.8303	0.8348	0.7145	0.7136	0.5061	0.6966	0.6956	0.6730	0.6613
0.8579	0.8713	0.7066	0.7048	0.4902	0.6999	0.6993	0.6761	0.6688
0.8372	0.8442	0.6769	0.6754	0.4900	0.6910	0.6897	0.6630	0.6567
0.8502	0.8558	0.6811	0.6795	0.4950	0.7132	0.7113	0.6688	0.6583
0.8677	0.8712	0.6707	0.6688	0.4984	0.7192	0.7172	0.6711	0.6542
0.8733	0.8817	0.6357	0.6329	0.5038	0.7203	0.7181	0.6735	0.6548
0.8667	0.8742	0.6078	0.6050	0.4867	0.7133	0.7113	0.6700	0.6553
0.8821	0.8888	0.6007	0.5978	0.4652	0.7465	0.7445	0.6829	0.6641
0.8709	0.8760	0.5934	0.5909	0.4666	0.7409	0.7389	0.6809	0.6649
0.8686	0.8810	0.5784	0.5757	0.4640	0.7393	0.7372	0.6828	0.6652
0.8514	0.8621	0.5684	0.5653	0.4562	0.7487	0.7469	0.6845	0.6669
0.8412	0.8562	0.5785	0.5756	0.4504	0.7435	0.7417	0.6841	0.6684
0.8316	0.8483	0.5838	0.5810	0.4509	0.7548	0.7530	0.6904	0.6733
0.8425	0.8497	0.6669	0.6651	0.4939	0.7032	0.7019	0.6734	0.6604
0.0007	0.0008	0.0057	0.0059	0.0010	0.0016	0.0016	0.0001	0.0000
0.0313	0.0331	0.1130	0.1154	0.0639	0.0568	0.0569	0.0148	0.0000
	0.0005		0.0054	0.0010		0.0011		0.0001

*Fixed weight equals the industry's 1948 weight.
**Calculated from the above data through use of equation (3).
***One industry sector, therefore, current = fixed.
Source: U.S. Department of Commerce, Office of Business Economics, *National Income and Product Accounts of the United States, 1929–1965* (Washington: G.P.O., 1966), pp. 18–21, 90–93.

tary services. These results augment those and suggest that the relative share of income going to labor increased during the eighteen-year period, 1948–1965, in most of the sectors studied.

The quadratic term is significant for fixed and/or current weighted sector shares in six of the nine sectors. In some cases the added t^2 term lowers the t ratio for the linear term, while in others it raises it. The quadratic form of the equation gives the best fit for the data in most of the sectors. The sign of the quadratic term is negative in five instances, indicating that the labor share in these sectors was increasing at a decreasing rate. Certainly the evidence is mixed, however. For example, in the communication sector the labor share seems to be declining at a decreasing rate.

When the unemployment rate is added in regression equations (6) and (7), the

Table 3. Regression Results by Sector, 1948–1965.
[Equation (4) $s_{it} = a + bt$]
[Equation (5) $s_{it} = a + bt + ct^2$]

Sector	*a*	*b*	*c*	R^2
(1) Agriculture, forestry, and fisheries				
Current weights	.16861	.00131	—	.2924
		(2.57145)**		
	.15588	.00531	−.00020	.4392
		(2.58555)**	(−1.98100)	
Fixed weights	.16649	.00060		.0943
		(1.29086)		
	.15661	.00357	−.00016	.2283
		(1.88767)	(−1.61350)	
(2) Mining				
Current weights	.68519	.00522	—	.5515
		(4.43556)*		
	.65465	.01438	−.00048	.6520
		(3.17484)*	(−2.08199)	
Fixed weights	.71018	.00604		.5175
		(4.14242)*		
	.65709	.02197	−.00084	.7299
		(4.60403)*	(−3.43486)*	
(3) Contract construction				
Current weights	.70552	.00671	—	.8484
		(9.46090)*		
	.67348	.01632	−.00051	.9513
		(9.29595)*	(−5.63516)*	
Fixed weights	.70552	.00671	—	.8484
		(9.46090)*		
	.67348	.01632	−.00051	.9513
		(9.29595)*	(−5.63516)*	
(4) Manufacturing				
Current weights	.71631	.00459	—	.6273
		(5.18931)*		
	.68591	.01371	−.00048	.7736
		(4.54759)*	(−3.11292)*	
Fixed weights	.73003	.00242	—	.5091
		(4.07381)*		
	.70332	.01044	−.00042	.8381
		(6.98596)*	(−5.51994)*	
(5) Transportation				
Current weights	.81050	.00336	—	.4210
		(3.41069)*		
	.01631	.01450	−.00059	.6936
		(4.62201)*	(−3.65306)*	
Fixed weights	.81117	.00405	—	.5294
		(4.24233)*		
	.77570	.01469	−.00056	.7453
		(4.78318)*	(−3.56527)*	
(6) Communication				
Current weights	.80184	−.01421	—	.9461
		(−16.76384)*		
	.83138	−.03307	.00047	.9679
		(−8.06443)*	(3.18826)*	

Table 3. (Continued.)

Sector	*a*	*b*	*c*	R^2
Fixed weights	.80199	−.01441 (−16.80891)*	—	.9464
	.83216	−.02346 (−8.16173)*	.00048 (3.24048)*	.9685
(7) Electric, gas, and sanitary services				
Current weights	.54865	−.00576 (−10.28394)*	—	.8686
	.56063	−.00936 (−4.14573)*	.00019 (1.63808)	.8885
Fixed weights	.54865	−.00576 (−10.28394)*	—	.8686
	.56063	−.00936 (−4.14573)*	.00019 (1.63808)	.8885
(8) Wholesale and retail trade				
Current weights	.63230	.00746 (13.53482)*	—	.9197
	.60973	.01423 (.91641)	−.00036 (−.74616)	.9644
Fixed weights	.63230	.00733 (13.51387)*	—	.9194
	.61077	.01378 (8.43335)*	−.00034 (−4.06641)*	.9617
(9) Services				
Current weights	.65834	.00158 (7.84483)*	—	.7937
	.65984	.00113 (1.29318)	.00002 (.53308)	.7975
Fixed weights	.65143	.00087 (3.09312)*	—	.3742
	.65767	−.00101 (−.90030)	.00010 (1.72340)	.4776

*Significant at the .01 level.
**Significant at the .05 level.
Source: See Table 2.

regression coefficients for the unemployment variable are not significant at the .01 level for any sector. The unemployment coefficient in equation (7) is statistically significant at the .02 level only for the electric, gas, and sanitary services sector. Moreover, the coefficient of determination (R^2) changed very little when the U term was introduced. Since the results using the U term were not significant, they are not explicitly reported. The suggested conclusion is that the positive trend in labor's share for most of the sectors tested is real and independent of cyclical fluctuations.

Results at the Industry Level

Regression equations (4) and (5) also are used to test for the existence of a trend at the industry level. It would have been desirable to weight the components of the industries and apply the Solow test (equation 3), but data at the level of the firm are not available. If the coefficient of determination (R^2) is used as a measure of the goodness of fit, Table

4 indicates that in almost every industry, the addition of the quadratic term improves the goodness of fit considerably. As with the sector analysis, therefore, the quadratic equation (5) is used to detect trends.

Twenty one of the fifty-two industries had shares increasing at a decreasing rate, with regression coefficients for the t and t^2 terms significant at the .05 level. Eight industries show labor's share increasing, with regression coefficients for the t term significant at the .05 level or better and with the t^2 variable not significantly different from zero. In nineteen instances both the t and t^2 terms are not signifiantly different from zero at the .05 level, suggesting lack of significant trend (that is, constancy of labor's share). The remaining four industries have shares decreasing, two at a decreasing rate and two at a constant rate: telephone and telegraph; automobile repair; radio broadcasting and television; and electric, gas, and sanitary services, respectively. Thus, in all but four cases labor's share is either increasing or shows no significant trend. This is consistent with the findings for the sectors, where six of eight sectors had labor share increasing.

The four industries showing a decrease in labor's share were in three sectors. In the service sector the automobile repair industry appears to have experienced a declining labor share. The coefficient of determination of .45 does not indicate a high degree of explanatory power, suggesting that variables other than time may be important in explaining movement of labor's share in this industry.

The other three industries in which labor's share declined have results which are consistent with the sector results. These three industries are the components of the two sectors in which labor's share decreased: communications and electric, gas, and sanitary services. In each of these industries the coefficients of determination are above .75 and regression coefficients for the linear terms of the quadratic equations are significant at the .01 level. The results strongly suggest that labor shares in these industries are indeed decreasing. It is interesting to note that these industries are subject to a great degree of governmental regulation and are composed of firms usually termed "natural monopolies." An explanation of labor's decreasing share in these cases may lie in such common characteristics. In contrast, however, there are other industries in the study (such as railroad transportation) which are government-regulated "natural monoplies" and which display a significant increase in labor's share. The common characteristics of industries in which labor's share decreased would seem to be an excellent subject for further research.

Comparison of Manufacturing Sector and Industry Results

Of the twenty-one industries in the manufacturing sector, eleven had labor shares increasing either at a decreasing or constant rate at the .05 level of significance. Ten manufacturing industries had regression coefficients not significantly different from zero at the .05 level, suggesting constancy of labor's shares. The results at the industry level, which mostly show either labor's share increasing at a decreasing rate or constant, are compatible with the sector findings. The results for the manufacturing sector, however, should be analyzed with caution. The Solow test (equation 3) showed evidence of positive intercorrelations among the component industries for only one sector, manufacturing. Solow explains the ex-

Table 4. Regression Results by Industry, 1948–1965.
[Equation (4) $s_{it} = a + bt$]
[Equation (5) $s_{it} = a + bt + ct^2$]

Industry	*a*	*b*	*c*	R^2
Farms	.15640	.00530	—	.0714
		(1.10935)		
	.14686	.00339	−.00015	.1937
		(1.73809)	(−1.50849)	
Agricultural services, forestry, and fisheries	.49251	.00301	—	.6291
		(5.20904)*		
	.47148	.00931	−.00033	.7927
		(4.93794)*	(−3.44152)*	
Metal mining	.62737	.00916	—	.2876
		(2.54138)**		
	.54464	.03398	−.00131	.4122
		(2.37273)**	(−1.78328)	
Coal mining	.88984	−.00093	—	.0156
		(−.50434)		
	.82237	.01931	−.00107	.4511
		(3.19768)*	(−3.44979)*	
Crude petroleum and natural gas	.52198	.01394	—	.8922
		(11.50588)*		
	.50011	.02051	−.00035	.9039
		(4.09797)*	(−1.34933)	
Nonmetallic minerals	.64859	.00604	—	.3520
		(2.94825)*		
	.58063	.02643	−.00107	.5892
		(3.70619)*	(−2.94261)*	
Contract construction	.70552	.00671	—	.8484
		(9.46090)*		
	.67348	.01632	−.00051	.9513
		(9.29595)*	(−5.63516)*	
Food	.74128	.00323	—	.4526
		(3.63696)*		
	.70724	.01344	−.00054	.7198
		(4.83825)*	(−3.78256)*	
Tobacco	.51578	−.00640	—	.7416
		(−6.77649)*		
	.51844	−.00720	.00004	.7423
		(−1.74574)	(.19941)	
Textiles	.79882	.00275	—	.1056
		(1.37444)		
	.71389	.02823	−.00134	.6405
		(5.08604)*	(−4.72391)*	
Apparel	.86866	.00132	—	.1431
		(1.63446)		
	.84068	.00971	−.00044	.4875
		(3.56829)*	(−3.17477)*	
Paper	.63752	.00966	—	.7953
		(7.88345)*		
	.65878	.00328	.00034	.8157
		(.64596)	(1.29123)	

Table 4. (Continued.)

Industry	*a*	*b*	*c*	R^2
Printing	.79137	.00237	—	.5094
		(4.07620)*		
	.76987	.00882	−.00034	.7320
		(4.69144)*	(−3.52991)*	
Chemicals	.55864	.00660	—	.6142
		(5.04731)*		
	.52740	.01598	−.00049	.6874
		(3.10235)*	(−1.87304)	
Petroleum	.32221	.00836	—	.6836
		(5.87896)*		
	.28396	.01983	−.00060	.7597
		(3.66091)*	(−2.17966)**	
Rubber	.77990	.00267	—	.1170
		(1.45627)		
	.79344	−.00139	.00021	.1330
		(−.17491)	(.52593)	
Leather	.85407	.00260	—	.1394
		(1.60954)		
	.83099	.00952	−.00036	.1979
		(1.39843)	(−1.04672)	
Lumber	.72816	.00330	—	.3548
		(2.96634)*		
	.68946	.01491	−.00061	.6138
		(3.95924)*	(−3.17205)*	
Furniture	.82495	.00219	—	.2915
		(2.56557)**		
	.80327	.00870	−.00034	.4429
		(2.62347)**	(−2.01888)	
Stone, clay, and glass	.69673	.00394	—	.4219
		(3.41698)*		
	.72461	−.00443	.00044	.5343
		(−.97868)	(1.90332)	
Primary metal	.69538	.00702	—	.5740
		(4.64354)*		
	.69342	.00761	−.00003	.5743
		(1.15115)	(−.09139)	
Fabricated metal	.78184	.00450	—	.5196
		(4.15959)*		
	.74577	.01532	−.00057	.6968
		(4.07466)*	(−2.96090)*	
Machinery, excluding electrical	.75838	.00329	—	.3125
		(2.69685)**		
	.72230	.01412	−.00057	.5120
		(3.13806)*	(−2.47604)**	
Electrical machinery	.77464	.00585	—	.6283
		(5.20032)*		
	.76601	.00844	−.00014	.6356
		(1.73362)	(−.54787)	
Transportation equipment and ordinance	.89299	.00102	—	.0475
		(.89342)		
	.87611	.00608	−.00027	.1171
		(1.26864)	(−1.08717)	

Table 4. (Continued.)

Industry	*a*	*b*	*c*	R^2
Motor vehicles and equipment	.62934	.00165	—	.0181
		(.54248)		
	.54743	.02622	−.00129	.2554
		(2.26700)**	(−2.18639)**	
Instruments	.79387	−.00195	—	.1249
		(−1.51122)		
	.75617	.00936	−.00060	.3732
		(1.95994)	(−2.43730)**	
Miscellaneous manufacturing industries	.75299	.00430	—	.5737
		(4.64013)*		
	.74468	.00680	−.00013	.5851
		(1.69947)	(−.64187)	
Railroad transportation	.81726	.00529	—	.5748
		(4.65082)*		
	.78288	.01560	−.00054	.7040
		(3.76128)*	(−2.55877)**	
Local, suburban, and highway passenger transportation	.87297	−.00178	—	.4023
		(−3.28157)*		
	.85224	.00444	−.00033	.6925
		(2.60959)**	(−3.76248)*	
Motor freight transportation	.73572	.00670	—	.7944
		(7.86183)*		
	.69213	.01978	−.00069	.9730
		(14.64670)*	(−9.96502)*	
Water transportation	.86565	.00243	—	.1419
		(1.62650)		
	.81109	.01880	−.00086	.5207
		(3.84342)*	(−3.44310)*	
Air transportation	.87921	.00204	—	.0213
		(.59020)		
	.83886	.01414	−.00064	.0656
		(.95760)	(−.84332)	
Pipeline transportation	.61927	−.01150	—	.6630
		(−5.61028)*		
	.60115	−.00606	−.00029	.6717
		(−.68548)	(−.63260)	
Transportation services	.79625	.00059	—	.0335
		(.74453)		
	.78927	.00268	−.00011	.0587
		(.78799)	(−.63336)	
Telephone and telegraph	.79906	−.01506	—	.9470
		(−16.91037)*		
	.83052	−.02450	.00050	.9690
		(−8.22319)*	(3.25969)*	
Radio broadcasting and television	.83160	−.00781	—	.7696
		(−7.31137)*		
	.84913	−.01307	.00028	.7902
		(−2.93196)*	(1.21387)	
Electric, gas, and sanitary services	.54865	−.00576	—	.8686
		(−10.28394)*		
	.56063	−.00936	.00019	.8885
		(−4.14573)*	(1.63808)	

Table 4. (Continued.)

Industry	*a*	*b*	*c*	R^2
Wholesale trade	.70737	.00448	—	.7154
		(6.34148)*		
	.69256	.00893	−.00023	.7569
		(3.12386)*	(−1.59984)	
Retail trade	.59655	.00868	—	.9351
		(15.18831)*		
	.57181	.01610	−.00039	.9756
		(10.49990)*	(−4.98123)*	
Hotels and other lodging places	.69175	.00758	—	.9049
		(12.33971)*		
	.67748	.01186	−.00023	.9602
		(4.87468)*	(−1.81023)	
Personal services	.63630	.00076	—	.2518
		(2.32048)**		
	.63181	.00210	−.00007	.2989
		(1.52409)	(−1.00423)	
Miscellaneous business services	.70011	.00442	—	.7321
		(6.61156)*		
	.72723	−.00372	.00043	.8789
		(−1.89418)	(4.26389)*	
Automobile repair	.61621	−.00118	—	.0973
		(−1.31299)		
	.64702	−.01042	.00049	.4531
		(−3.42116)*	(3.12375)*	
Miscellaneous repair services	.47807	.00665	—	.6983
		(6.08498)*		
	.50799	−.00233	.00047	.7735
		(−.56180)	(2.23110)**	
Motion pictures	.77262	.00906	—	.6330
		(5.25296)*		
	.72018	.02473	−.00083	.7473
		(3.97834)*	(−2.60425)**	
Amusements	.75463	.00156	—	.1745
		(1.83920)		
	.76885	−.00270	.00022	.2513
		(−.76314)	(1.23991)	
Medical and other health services	.40401	.00566	—	.8233
		(8.63498)*		
	.40067	.00666	−.00005	.8249
		(2.33465)**	(−.09290)	
Legal services	.20014	.00294	—	.7538
		(6.99832)*		
	.18206	.00837	−.00029	.9051
		(7.33016)*	(−4.89038)*	
Educational services	.89539	.00179	—	.5989
		(4.88807)*		
	.90610	−.00142	.00017	.7126
		(−1.04607)	(2.43569)**	
Nonprofit membership organizations	.98242	.00008	—	.0148
		(.49053)		
	.96656	.00184	−.00009	.4612
		(3.57745)*	(−3.52551)*	

Table 4. (Concluded.)

Industry	*a*	*b*	*c*	R^2
Miscellaneous professional services	.58270	.00368 (4.10081)*	—	.5124
	.52206	.00987 (2.77267)**	−.00033 (−1.79007)	.5983

*Significant at .01 level.
**Significant at .05 level.
Source: See Table 2.

istence of such industry intercorrelations as follows:

> There are various ways of explaining the facts. Perhaps it is a fair idealization that the several industries buy their labor and capital inputs in the same or similar markets, so they can be imagined to face the same factor prices. If it is further assumed that each industry produces a single commodity with a technology describable by a smooth production function, then everything will depend on the distribution of elasticities of substitution among industries. If nearly all elasticities of substitution are on the same side of unity, then the wage shares will go up and down together in nearly all industries and there will be strong positive correlation. If elasticities of substitution are evenly divided on both sides of unity, there will be two groups of industries whose wage shares will move in opposed phase. Whether the net result is to increase or reduce the variance of the aggregate wage share as compared with the hypothetical zero-correlation value will depend in a complicated way on the arrangement of weights and elasticities.[11]

This makes the sector results for manufacturing suspect, because there is an implicit statistical bias.

It is tempting to turn to the industry results for manufacturing to provide a more detailed consideration of labor's share. The difficulty, of course, is that the Solow test cannot be applied at the industry level, since no data are published for the component firms.

In comparing our findings with those of Gujarati for the manufacturing sector and its industries, it is important to evaluate the results of the Solow test before considering regression results. Both Gujarati's study and ours found net positive intercorrelations for the components of the manufacturing sector.[12] Thus, regression results for the manufacturing sectors of both studies are suspect because of statistical bias in the data as measured by the Solow test. A comparison of results shows differing trends in labor's share for the manufacturing sector. Given statistical bias in the data, there is no meaningful comparison using regression analysis which can be made. Of course, differences in results also may reflect differences in concepts between OBE and Census of Manufactures data.

At the manufacturing industry level, the results should be reviewed with the same caution. Since the Solow test was not applied, there is no way of knowing if statistical bias exists in the industry data. The fact that it was present at the sector level might cause one to be cautious in using the industry level data. Again, as with the sector results, a comparison of the manufacturing industry results shows some divergence. In nine of the twenty manufacturing industries the signs of the regression coefficients for the linear terms in both studies are not sig-

[11] Solow, "A Skeptical Note on the Constancy of Relative Shares," pp. 625, 626.

[12] "Labor's Share in Manufacturing Industries, 1949–1964," p. 68.

nificantly different from zero, as are the signs of the respective quadratic variables.[13] The rest of the industries have regression coefficients with different signs.

In summary, then, the results for the manufacturing industries in both studies have statistical bias which makes comparison of regression results of questionable value. While this study found labor's shares increasing or constant in all manufacturing industries, Gujarati found a number with decreasing shares. Thus, neither set of results for manufacturing would appear to be reliable.

Conclusions

At the sector level, we can conclude that the results are consistent with the hypothesis that for every sector except manufacturing labor's share over time behaved as if its components were acting independently, giving considerable assurance that changes in the sector shares do not reflect statistical illusion. In the eight sectors which did not display aggregative illusion, labor had either increasing or constant shares in six. The upward or constant trend in these sectors could not be attributed to cyclical influence, since the unemployment rate, which served as a proxy for cyclical movement, was not a significant factor when introduced into the regression equations.

Forty-eight industries of the fifty two studied had increasing or constant shares. This provides substantial evidence that labor's share does not seem to be declining.

The quadratic equations suggest that in most cases where labor's share is increasing, it is increasing at a decreasing rate, which along with the evidence of constancy for numerous other industries suggests that in the long run one might expect relatively constant shares in most industries. Another conclusion which emerges is that in several industries, such as automobile repair services and telephone and telegraph, labor's share is decreasing at a decreasing rate. Again, the conclusions based on the findings for the industries should be taken with caution since no test for aggregative illusion in the data could be performed at the industry level.

[13]Gujarati used only 20 manufacturing industries in his studies.