Inflation, Recession and Functional Income Distribution

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〈Contents〉

I. Introduction
II. The Impact of Recession and Recovery
III. The Impact of Inflation: Elasticity Approach
IV. The Determinants of the Relative Wage Share: Regression Approach
V. The Regression Results
VI. Summary and Conclusions

I. Introduction

Just as per capita GNP is often regarded as an index of economic welfare of a country, the relative wage share often has been regarded as a measure of the relative welfare position of the workers. Also it was often assumed without convincing evidence that the relative wage share is related to the personal size income distribution. For these and other reasons, a large number of studies have been published on the relative wage share.

These studies may be grouped into two categories. The first category is interested in the measurement of the "true" labor share and its long-term trend, and the second category is interested in the cyclical behavior of the relative wage share. There are two opposing views in the first category. The first view is that the true relative labor share has increased slightly, moderately, or drastically. This view is held by Kuznets[11, 12], Johnson[6], Solow[15], Kravis [10], Kendrick and Sato[8]. Another is that the true relative wage share remained constant without showing any significant time trend. This view is held by Kalecki[7], Weintraub[16], Klein and Kosbud[9], and Denison[3, 4].

The differences in the above findings are largely due to different definitions

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of the true labor share, and rearrangement of the available statistical data. For instance, the true labor income may include only the wage of manual labor, both wages and salaries, all or a portion of the proprietor's income, wages and salaries of private sector only, excluding the government sector, or may include or exclude the supplements to labor, may include or exclude the employer contributions for social insurance funds, and so on. There is also the question of the denominator. The labor income may be divided by GNP, national income, personal income, private business income excluding the government sector, or by income which includes the imputed rent on the government and private properties, etc.

The second category of studies is concerned with the cyclical fluctuations of the relative income shares. Dunlop[5] found that the cyclical patterns of the various definitions of the labor share were similar, i.e., the labor share rose sharply in deep depressions. Schuller[14] found that the relative labor share decreased during long and severe depression and inflation periods. Burkhead[2] found that the labor share tended to decrease during prosperity and increase during contraction. Bach and Ando(1957) observed the changes in the relative wage share during three inflation periods. The labor share in personal income stayed the same during 1936~46, increased both during the 1946~49 and 1949 ~52 periods. The labor share of national income decreased during 1939~46, stayed constant during 1946~49, and increased during 1946~52. They conclude that the above evidence does not support the conventional wage-lag hypothesis.

The general characteristics of the above and other empirical studies on the labor share may be summarized. First, most studies are concerned with the rearrangement of the statistical data to find the "true" labor share. Second, most studies compare the simple numerical values of the relative wage share between the two periods to find the changes in the relative labor share, and no statistical technique, even an elementary regression analysis, was used. Though Klein and Kosbud[9] used regression analysis, their interest was only in proving the lack of time trend in the "true" labor share.

In this paper, we are interested in the empirical determinants of the relative wage share, particularly the impact of recession. The significance of such a study, particularly the effect of inflation on the relative wage share is twofold. One is to evaluate the welfare effect of inflation on the relative wage share.

Recently, a group of economists argued that inflation causes the real wage rate to fall. As a result, employment increases and the rate of unemployment among the poor decreases. The relative wage share increases and the personal size income distribution improves. Whether this is empirically true or false must await the evidence.

Another significance of such a study is to test a few hypotheses concerning the effect of inflation: (1) According to the wage-lag hypothesis, the wage rate tends to lag behind the level of prices, and there is no immediate increase in the level of employment. As a result, the relative wage share decreases during the periods of inflation. (2) According to the Phillips curve hypothesis, or the Keynesian theory, when the level of prices rises, wage lags behind the price level, and thus the real wage rate falls. As a result the demand for labor rises, and employment and output increase. Whether the relative wage share increases or not depends upon a number of elasticities with respect to price level (see Equations (2) and (3) in Section III). (3) According to the early monetarists, when the level of prices rises, the real wage rate falls, and employment and output both increase, as is true in the Keynesian model. However, they maintain that it is true only in the short-run. In the long-run, the real wage rate rises to the initial equilibrium rate, and employment and output both decrease to the initial levels. Thus in the long run, inflation can not influence the real wage rate, employment and real output. Thus, the natural rate of unemployment and the relative wage share are both independent of the rate of inflation. (4) However, the rational expectationists deny even the short-run effect of inflation on the real wage rate, employment and real output. They argue that workers are too rational to be fooled by the money illusion. Workers demand higher wage rates when a higher inflation rate is expected, and also more workers are covered by cost-of-living clauses in their wage contracts. And thus wages do not lag behind prices. As a result, inflation cannot significantly influence the real wage rate, employment, real output and the relative wage share even in the short-run.

In the following Section III, the long-run trend and the cyclical movements of the four concepts of the relative wage share are analyzed in terms of elasticities. In Sections IV and V, a number of regression equations are calculated to test the statistical significance of possible determinants of the relative wage share. In the final Section VI, a summary and conclusions are presented.

II. The Impact of Recession and Recovery

In order to observe the movements in the relative wage share, four concepts of relative wage share are depicted in Figure 1. The four concepts are defined below:

(1) TC/NY=The share of total compensation in national income. The total compensation includes wages, salaries, and supplements. The supplements include employer contributions for social insurance and to private pension, health, and welfare funds, workmen's compensation, directors' fees, and a few minor items (*Economic Report of the President, 1978*, p. 279).

(2) WS/NY=The share of wages and salaries, excluding the supplements, in national income.

(3) TC/PY=The share of wage and salary disbursements and other labor income in personal income. The share of wage and salary disbursements and other labor income differs from total compensation of employees in national income in that it excludes employer contributions for social insurance

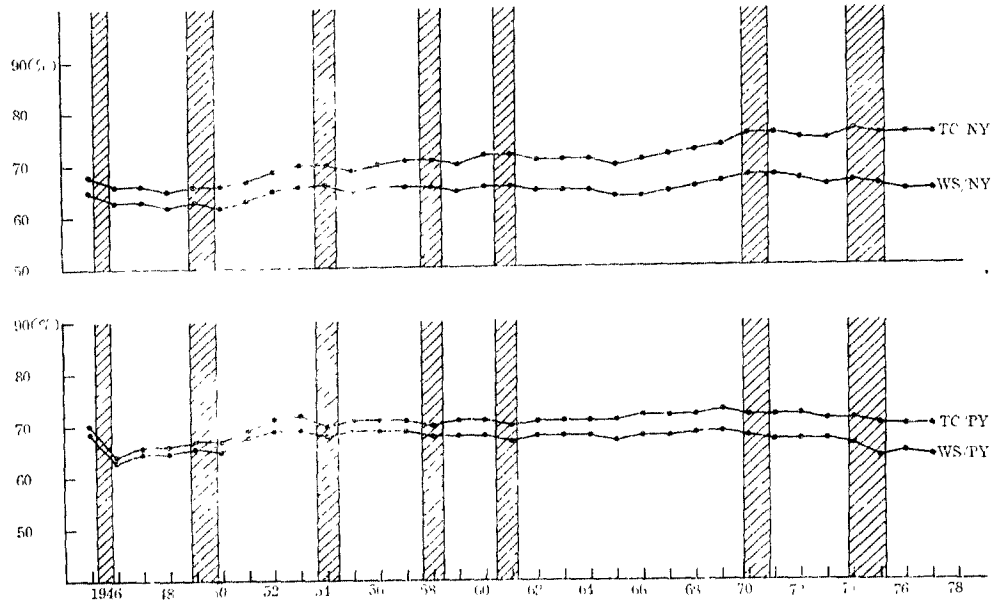

Fig. 1. The Relative Wage Shares in the U.S. 1945~77

and the excess of wage accruals over wage disbursements(*ibid.*, p. 281).

(4) WS/PY=The share of wages and salaries, excluding the other labor income, in personal income.

As to their long-term movements between 1945 and 1977, we note the following: First, the TC/NY ratio shows a mild increasing tendency. It increased from 68.2% in 1945 to 76% in 1977. Second, the WS/NY ratio remained constant between 1945 and 1977 at 65.1% though it showed some fluctuations during the period. Third, the TC/PY ratio also remained almost constant at 70.3% in 1945 and 70.2% in 1977, though it was at a lower level during 1945~51. Fourth, the WS/PY ratio decreased from 69.2% in 1945 to 64.4% in 1977.

In effect, TC/NY was rising, WS/NY and TC/PY were constant, and WS/PY was falling during the period 1945~77, although all four concepts had cyclical fluctuations. The increasing gap between TC/NY and WS/NY may be partly explained by the fact that TC in NY includes the employer contributions for social insurance and that social security tax rate and the maximum taxable income were rising significantly during the period. The social security tax rate for both employer and employee started at 1% of the maximum taxable income base $3,600 in 1935, and it increased to 5.85% of the maximum taxable income $16,500 in 1977.

In order to observe the cyclical fluctuations in the relative wage share, the recession periods are indicated by the shaded area in Figure 1. During 1945~77, we have experienced seven recessions.(1) We note that TC/PY and WS/PY declined during recessions, but TC/NY and WS/NY were apparently not affected by the recessions. More accurate movements of the relative wage shares during the recessions are shown in Table 1 and 2.

(1) The seven recessions are given below:

Peak	Trough	Contraction in months
1945 Feb.	1945 Oct.	8
1948 Nov.	1949 Oct.	9
1953 July	1954 May	10
1957 Aug.	1958 April	8
1960 April	1961 Feb.	10
1969 Dec.	1970 Nov.	11
1973 Nov.	1975 March	16

Note: NBER data, as printed in Bureau of the Census, *Business Conditions Digest*, Sept. 1977.

Table 1. The Relative Wage Share and Recession (One Year Prior to Trough) (%)

	$\frac{TC}{NY}$	$\frac{WS}{NY}$	$\frac{TC}{PY}$	$\frac{WS}{PY}$	U
1944	66.6	64.2	72.0	71.1	1.2
1945*	68.2	69.2	70.3	69.2	1.9
	+1.6	+5.0	−1.7	−1.9	+0.7
1948	64.6	61.9	66.3	65.0	3.1
1949*	66.4	65.6	67.0	65.6	5.9
	+1.8	+3.7	+0.7	+0.6	+2.1
1953	69.6	66.2	71.5	69.4	2.9
1954*	69.7	65.8	70.4	68.3	5.5
	−0.2	−0.4	−1.1	−1.1	+2.6
1957	70.8	66.1	71.1	68.5	4.3
1958*	70.9	66.1	69.6	66.9	6.8
	+0.1	0.0	−1.5	−1.6	+2.5
1960	71.6	66.0	70.8	68.0	5.5
1961*	71.6	65.9	70.2	67.3	6.7
	0.0	−0.1	−0.6	−0.7	+1.2
1969	74.4	67.0	72.8	69.0	3.5
1970*	76.3	68.2	72.2	68.2	4.9
	+1.9	+1.2	−0.6	−0.8	+1.4
1974	77.1	67.3	71.0	66.2	5.6
1975*	76.0	66.2	69.5	64.3	8.5
	−1.1	−1.1	−1.5	−1.9	+2.9

Note: *=trough year.
U=the rate of unemployment.

Table 1 compares the relative wage share between trough years and one year prior to the troughs. We note that the relative wage shares measured by TC/PY and WS/PY tended to decrease during recessions. That is, the ratios decreased 6 times and increased 1 time. However, TC/NY and WS/NY reacted in a very irregular way. TC/NY increased 4 times, decreased 2 times, and remained constant 1 time. WS/NY increased 3 times, and remained constant 1 time.

Table 2 is to show the impact of recovery on the relative wage share. We note that TC/NY and WS/NY show negative signs between the trough and one year after the trough. However, the relative wage shares measured by TC/PY and WS/PY show mixed signs. They increased 4 times, and decreased 3 times. These results suggest the following: (1) TC/PY and WS/PY tend to

Table 2. The Relative Wage Share and Recession (One Year after Trough) (%)

	$\frac{TC}{NY}$	$\frac{WS}{NY}$	$\frac{TC}{PY}$	$\frac{WS}{PY}$	U
1945*	68.2	65.1	70.3	69.2	1.9
1946	66.2	62.8	64.3	63.2	3.9
	−2.0	−2.3	−6.0	−6.0	+2.0
1949*	66.4	63.3	67.0	65.6	5.9
1950	65.5	62.2	66.7	65.0	5.3
	−0.9	−1.1	−0.3	−0.6	−0.6
1954*	69.7	65.8	70.4	68.3	5.5
1955	68.6	64.5	70.8	68.6	4.4
	−1.1	−1.3	+0.4	+0.3	−1.1
1958*	70.9	66.1	69.6	66.9	6.8
1959	70.4	65.2	70.5	67.8	5.5
	−0.5	−0.9	+0.9	+0.9	−1.3
1961*	71.6	65.9	70.2	67.3	6.7
1962	71.1	65.2	70.6	67.6	5.5
	−0.5	−0.7	+0.4	+0.3	−1.2
1970*	76.3	68.4	72.2	68.2	4.9
1971	75.8	67.6	71.7	67.4	5.9
	−0.5	−0.8	−0.5	−0.8	+1.0
1975*	76.4	66.2	69.5	64.3	8.5
1976	76.0	65.4	70.0	64.5	7.7
	−0.4	−0.8	+0.5	+0.2	−0.8

Note: *=trough year.
U=the rate of unemployment.

decrease during contraction. However, during recovery, TC/PY and WS/PY tend to recover at a slower rate than the rate at which they decreased during contraction. (2) TC/NY and WS/NY show mixed reactions during contraction, but they tend to decrease during recovery.

The differences in the movements of the labor shares may be largely explained by different behaviors of national income and personal income during contraction and expansion. Table 3 and 4 are prepared to observe movements of national income, personal income and the labor shares during contraction and expansion. We note the following points: (1) During contraction, national income and personal income do not necessarily decrease, because of inflation even during contraction. When national income and personal income both decrease,

Table 3. National Income, Personal Income, and the Labor Shares
(One Year Prior to Trough) (In Billion Dollars)

	(1) NY	(2) PY	(3) TC for NY	(4) WS for NY	(5) TC for PY	(6) WS for PY
1944	181.9	164.4	121.1	116.7	118.4	116.9
1945*	180.6	169.8	123.1	117 5	119.3	117.5
	−0.7(%)	3.3(%)	1.6(%)	0.7(%)	0.8(%)	0.7(%)
1948	219.0	208.5	141.4	135.5	138.2	135.5
1949*	212.7	205.6	141.3	134.7	137.7	134.8
	−2.9	−1.4	−0.01	−0.6	−0.4	−0.6
1953	299.7	286.1	209.6	198.5	204.5	198.6
1954*	299.1	288.2	208.4	196.8	202.9	196.8
	−0.2	0.7	−0.6	−0.9	−0.8	−0.9
1957	362.3	349.3	256.5	239.3	248.3	239.3
1958*	364.0	359.3	258.2	240.5	249.9	240.5
	0.5	2.9	0.7	0.5	0.6	0.5
1960	412.0	399.7	294.9	271.9	283.1	271.9
1961*	424.2	415.0	303.6	279.5	291.3	279.5
	3.0	3.8	3.0	2.8	2.9	2.8
1969	767.9	745.8	571.4	514.6	542.8	514.6
1970*	798.4	801.3	609.2	546.5	578.5	546.5
	4.0	7.4	6.6	5.8	6.6	5.8
1974	1,136.0	1,154.9	875.8	764.1	820.2	764.6
1975*	1,217.0	1,253.4	930.3	805.7	870.6	805.7
	7.1	8.5	6.2	5.4	6.1	5.4

national income decreases more rapidly than personal income and the labor shares do. When national income and personal income both increase during recession, personal income increases more rapidly than national income and the labor shares do. In such cases, TC/PY and WS/PY decrease more rapidly than TC/NY and WS/NY do during contraction. (2) During expansion, national income increases more rapidly than personal income and the labor shares. In such a case, TC/NY and WS/NY decrease during expansion. Also, during expansion, the labor shares increase more rapidly than personal income, and thus TC/PY and WS/PY both increase. Other minor irregularities may be explained by changes in exogenous policy variables such as increases in the social security tax rates and the maximum taxable income basis.

Table 4. National Income, Personal Income, and the Labor Shares
(One Year after Trough) (In Billion Dollars)

	(1) NY	(2) PY	(3) TC for NY	(4) WS for NY	(5) TC for PY	(6) WS for PY
1945*	180.6	169.8	123.1	117.5	119.3	117.5
1946	178.3	177.3	118.1	112.0	114.0	112.0
	−1.3(%)	4.4(%)	−0.4(%)	−4.7(%)	0.4(%)	−4.7(%)
1949*	212.7	205.6	141.3	134.7	137.7	134.8
1950	236.2	226.1	154.8	147.0	150.7	147.0
	11.0	7.9	9.6	9.1	9.4	9.1
1954*	299.1	288.2	208.4	196.8	202.9	196.8
1955	328.0	308.8	224.9	211.7	218.7	211.7
	9.7	7.1	7.9	7.6	7.8	7.6
1958*	364.0	359.3	258.2	240.5	249.9	240.5
1959	397.1	382.1	279.6	258.9	269.5	258.9
	9.1	6.3	8.3	7.7	7.8	7.7
1961*	424.2	415.0	303.6	279.5	291.3	279.5
1962	457.4	440.7	325.1	298.0	311.0	298.0
	7.8	6.2	7.1	6.6	6.8	6.6
1970*	798.4	801.3	609.2	546.5	578.5	546.5
1971	858.1	859.1	650.3	580.0	615.6	579.4
	7.5	7.2	6.7	6.1	6.4	6.0
1975*	1,217.0	1,253.4	930.3	805.7	870.6	805.7
1976	1,364.1	1,382.7	1,036.3	891.8	967.7	891.8
	12.1	10.3	11.4	10.7	11.2	10.7

III. The Impact of Inflation: Elasticity Approach

In order to measure the impact of inflation on the relative wage share two methods are adopted in this paper. One is the elasticity approach and the other, the regression method. The elasticity approach aims to measure the impact of inflation on the relative wage share indirectly, while the regression method, directly.

First, the elasticity method. The relative wage share is given by

$$k=wN/Q \qquad (1)$$

where w=the real wage rate, N=the number of wage and salary workers, Q=the real GNP. Assuming w, N, and Q are all functions of price P,[2] differ-

(2) The model consists of the following functions: $w=w(P)$, $N=N(w)$, $Q=Q(N)$. Thus $N=F_1(P)$, $Q=F_2(P)$.

entiating with respect to P, and multiplying by PQ/wN, we obtain:

$$\frac{dk}{dP}\frac{P}{k}=\frac{dw}{dP}\frac{P}{w}+\frac{dN}{dP}\frac{P}{N}-\frac{dQ}{dP}\frac{P}{Q} \qquad (2)$$

where

$\frac{dw}{dP}\frac{P}{w}$ = the price elasticity of real wage rate (-0.4289; -0.4697),

$\frac{dN}{dP}\frac{P}{N}$ = the price elasticity of employment (0.1997; 0.1294),

$\frac{dQ}{dP}\frac{P}{Q}$ = the price elasticity of real output (-0.4544; -0.1858).

The first numbers were obtained for 1945~77, and the second numbers were obtained for 1948~77. All the data were taken from *Economic Report of the President*, 1978. The following data were used: P=the consumer price index, $\Delta w/w=\Delta W/W-\Delta P/P$. The real wage rate growth rate was calculated as the money wage rate growth rate minus the inflation rate. The money wage rate represents the hourly wage rate of the manufacturing industry. N=the number of wage and salary workers. The elasticities were obtained from the regression results shown in Tables 5 and 6. Substituting these values in Equation (2) we obtain the price elasticity of relative wage share: 0.2232 for 1945~77, and -0.1545 for 1948~77. However, the elasticity values are not highly significant because they are based on the regression coefficients which are not all significant as shown in Tables 5 and 6.

Equation (2) may be rewritten as:

$$\frac{dk}{dP}\frac{P}{k}=\frac{dw}{dP}\frac{P}{w}\left(1+\frac{dN}{dw}\frac{w}{N}-\frac{dQ}{dN}\frac{N}{Q}\cdot\frac{dN}{dw}\frac{w}{N}\right) \qquad (3)$$

where

$\frac{dw}{dP}\frac{P}{w}$ = the price elasticity of real wage rate (-0.4289; -0.4697),

$\frac{dN}{dw}\frac{w}{N}$ = the real wage elasticity of employment of wage and salary workers (-0.1572; -0.2696),

$\frac{dQ}{dN}\frac{N}{Q}$ = the employment elasticity of real output (0.6992; 0.9815).

Again, the first elasticity values are for 1945~77, and the second for 1948~77. This time, we note that all the elasticity values have expected signs consistent with the marginal productivity theory of demand for labor. Substituting these values in Equation (3), we obtain the price elasticity of relative wage share:

Table 5. The Impact of Inflation (1945～77)

	Dependent variable	Intercept	$\Delta P/P$	Lagged dependent $(t-1)$	$\bar{R}^2$	F	DW	h_1
(1)	$\Delta w/w$	3.1848	−0.4289 (−7.33)**		0.6223	53.72	1.135	
(2)	(1.521)	3.0295	−0.4105 (−5.66)**	0.0576 (0.44)	0.6122	26.26	1.220	3.39
(3)	$\Delta N/N$	1.3680	0.1997 (1.75)*		0.0603	3.05	1.805	
(4)	(2.143)	1.3436	0.1970 (1.65)	0.0175 (0.10)	0.0293	1.48	1.833	—
(5)	$\Delta Q/Q$	4.4866	−0.4544 (−2.26)*		0.1139	5.11	1.619	
(6)	(2.724)	3.1773	−0.2930 (−1.23)	0.2440 (1.25)	0.1294	3.38	1.849	—
(7)	$\Delta N/N$	2.3818	$-0.1572\Delta w/w$ (−0.71)	−0.0156		0.51	1.834	
(8)	(2.143)	2.2210	−0.1528 (−0.68)	0.0771 (0.44)	−0.0428	0.34	1.946	—
(9)	$\Delta Q/Q$	1.2260	$0.6992\Delta N/N$ (2.33)*		0.1217	5.43	1.372	
(10)	(2.724)	−0.1102	0.7758 (2.84)**	0.4186 (2.79)**	0.2791	7.19	1.915	0.483
(11)	U	4.8833	$0.0139\Delta Q/Q$ (0.23)		−0.0305	0.05	0.734	
(12)	(4.921)	0.8578	−0.1972 (−4.4)**	0.9695 (7.87)**	0.6524	31.04	2.016	−0.065
(13)	U	4.8796	$0.0107\Delta P/P$ (0.15)		−0.0316	0.021	0.7032	
(14)	(4.921)	1.7998	0.0212	0.0212	0.4269	12.92	1.9889	0.046

Note: **Significant at the 1% level, *significant at the 5% level.
The numbers in the column of the dependent variables are the mean values, and the numbers in parentheses under the regression coefficients are the t-ratios.
h_1 is the Durbin's h statistic, where $\hat{\rho}_1=1-DW/2$. — indicates where h_1 statistic is not applicable. h_1 is given by $(1-\hat{\rho}_1)\sqrt{N/(1-NV(L))}$, where N=the number of observations, $V(L)$=the variance of the lagged dependent variable.

−0.4086 for 1945～77 and −0.4674 for 1948～77. These results are summarized in Table 7. These results suggest that when the price level rises by 10% the "true" relative labor share decreases by 4～4.7% in the United States. However, these elasticity values may be further modified by more refined regression results.

Figure 2 is intended to show the relationships among inflation, elasticity and the relative wage share. In panel (a), the initial price level is at P_2. When P_2 rises to P_3, depending upon the elasticity, the relative wage share will increase to k_3 or decrease to k_1. Panel (b) is the case when the elasticity is less than zero.

Table 6. The Impact of Inflation (1948~77)

	Intercept		Lagged dependent ($t-1$)	R	R^2	SEE	F	DW	h_2
(1) $\Delta N/N$	1.7498	0.1297$\Delta P/P$ (0.97)		0.1798	−0.0022	2.1525	0.9358	2.01	
(2) (2.193)	1.8711	0.1563 (1.63)	−0.0945 (−0.48)	0.2011	−0.0307	2.1828	0.57	1.88	—
(3) $\Delta Q/Q$	4.2301	−0.1858$\Delta P/P$ (−1.09)		0.2021	0.0066	2.7379	1.1921	2.0199	
(4) (3.593)	3.0858	−0.1351 (−0.80)	0.2883 (1.62)	0.3549	0.0612	2.6615	1.9456	2.4910	−5.735
(5) $\Delta W/W$	3.4594	0.5303$\Delta P/P$ (9.61)**		0.8759	0.7589	0.8880	12.39	1.2405	
(6) (5.277)	2.3633	0.4233 (7.94)**	0.2676 (3.81)**	0.9212	0.8375	0.7292	75.71	1.9395	0.241
(7) $\Delta w/w$	3.4594	−0.4697$\Delta P/P$ (−8.51)**		0.8492	0.7111	0.8880	72.39	1.2405	
(8) (1.850)	3.7936	−0.5010 (−8.12)**	−0.1239 (−1.12)	0.8565	0.7138	0.8838	37.17	1.0619	3.326
(9) $\Delta N/N$	2.1501	−0.2696$\Delta w/w$ (−1.12)		0.2072	0.0087	2.1407	1.2557	2.0595	
(10) (2.193)	3.0023	−0.3170 (−1.21)	−0.0986 (−0.51)	0.2278	−0.0183	2.1697	0.7390	1.9406	—
(11) $\Delta Q/Q$	1.4405	0.9815$\Delta N/N$ (6.35)**		0.7683	0.5756	1.7895	40.33	1.4503	
(12) (3.593)	1.1914	0.9421 (5.78)**	0.0997 (0.80)	0.7745	0.5702	1.8009	20.24	1.6063	1.558

Note: **Significant at the 1% level, *significant at the 5% level.
h_2 is the Durbin's h statistic for a small sample size. —indicates the h test is not applicable. For h_2, $\hat{\rho}_2=(N^2(1-DW/2)+k^2)/(N^2-k^2)$, where k=the number of independent variables plus the intercept. h_2 is given by $(1-\hat{\rho}_2)\sqrt{N/(1-NV(L))}$.

Table 7. Elasticities (1945~77, 1948~77)

		1945~77	1948~77
(1)	$\frac{dw}{dP}\frac{P}{w}$	−0.4289**	−0.4697**
(2)	$\frac{dN}{dP}\frac{P}{N}$	0.1997*	0.1294
(3)	$\frac{dQ}{dP}\frac{P}{Q}$	−0.4544*	−0.1858
(4)	$\frac{dN}{dw}\frac{w}{N}$	−0.1572	−0.2696
(5)	$\frac{dQ}{dN}\frac{N}{Q}$	0.6992*	0.9815**
(6)	$\frac{dk}{dP}\frac{P}{k}$	0.2232	−0.1545
(7)	$\frac{dk}{dP}\frac{P}{k}$	−0.4086	−0.4674

Note: **Significant at the 1% level, *significant at the 5% level. See Tables 3 and 4.

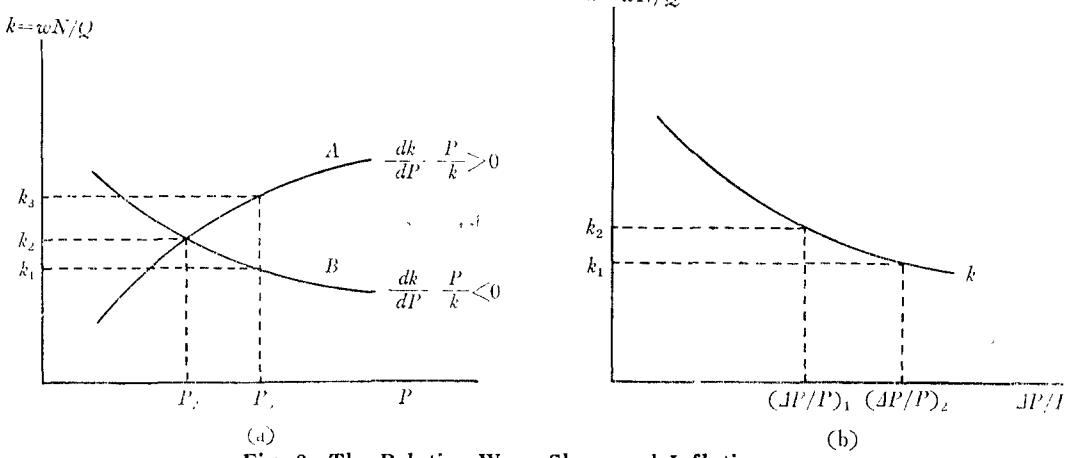

Fig 2. The Relative Wage Share and Inflation

IV. The Determinants of the Relative Wage Share: Regression Approach

In order to measure directly the impact of inflation on the relative wage share and to find statistically significant variables, a large number of regression equations were calculated. The regression models tested include the following:

$$W/Y=F[N/E, \Delta P/P, U, \Delta Q/Q, (W/Y)_{t-1}, e] \quad (4)$$

$$W/Y=F[(N/E)_{t-1}, (\Delta P/P)_{t-1}, U_{t-1}, (\Delta Q/Q)_{t-1}, (W/Y)_{t-1}, e] \quad (5)$$

$$\Delta(W/Y)=F[\Delta(N/E), \Delta(\Delta P/P), \Delta U, \Delta(\Delta Q/Q), e] \quad (6)$$

where

W/Y=the relative wage share, i.e., TC/NY, WS/NY, TC/PY, and WS/PY, as defined earlier (%),

N/E=the percent of wage and salary workers in total employment (%),

U=the rate of unemployment (%),

$\Delta P/P$=the rate of inflation in consumer price indexes (%),

$\Delta Q/Q$=the growth rate of real GNP (%),

$(W/Y)_{t-1}$=the relative wage share with one year of time lag (%),

e=the error term, and

Δ=the first difference operator.

All the above data were taken from *Economic Report of the President, 1978* and supplemented by *Historical Statistics of the United States, Colonial Times to 1970*.

Before we discuss the regression results, some explanations of the selected

independent variables may be useful.

First, the importance of the percent of wage and salary workers in explaining the changes in the relative wage share was stated by Brown and Hart [1]: "Applying economic analysis to the share of wages would be easier, if this share was the renumeration of a constant proportion of the whole working population; but in fact a main cause of the long-period changes in the share of wages has been simply the change in the relative number of wage-earners" (p. 253). Also Johnson [6] recognized the changes in agricultural and government employment as significant factors in explaining the changes in the relative wage share: "One change in the structure of the economy, namely the decline in the relative importance of agriculture, resulted in an increase in labor's share of the money value of the national income to a greater degree than would be indicated if national income were evaluated in real terms" (p. 180). Since the simple correlation coefficients were highly significant among the three variables, namely, the percent of wage and salary workers, the agricultural employment ratio, and the government employment ratio, the percent of wage and salary workers was chosen in the final regression equation.[3]

Second, as to the effect of inflation, there are several hypotheses, and we have already discussed in the introduction. In effect, according to the wage-lag hypothesis, the Keynesian theory, the Phillips curve hypothesis, the relative wage share may be affected by inflation. Whether the relative wage share increases or decreases depends upon elasticities of real wage rate, employment, and output. However, according to the classical theory, the monetarists, and the expectationists, inflation cannot influence the real variables and the relative wage share in the long run or very often even in the short-run.

Third, whether the rate of unemployment increases or decreases the relative

(3) The correlation coefficient r of the percent of wage and salary workers(N/E) was -0.969 with the agricultural employment ratio (A/E), and 0.963 with the government employment ratio (G/E) for 1945~77 data. The r between A/N and G/E was -0.954. For the period of 1948~77, r between N/E and A/E was -0.973, and 0.970 between N/E and G/E, and -0.986 between G/E and A/E. The percent of wage and salary workers N/E increased from 76.5% to 90.7% during 1945~77. The percent of agricultural employment A/E decreased from 16.2% to 3.6%, and the percent of government employees G/E increased from 11.0% to 16.8% during the period.
The simple correlation coefficient of $\Delta P/P$ was 0.026 with U, and -0.376 with $\Delta Q/Q$ for 1945~77. r between U and $\Delta Q/Q$ was 0.254. For 1948~77, r was 0.145 between $\Delta P/P$ and U, -0.202 between $\Delta P/P$ and $\Delta Q/Q$, and -0.284 between U and $\Delta Q/Q$. In the above correlation coefficients only -0.376 is significant at the 5% level.

wage share will depend upon a number of conditions. (a) If the rate of unemployment increases as a result of an increasing new labor force without decreasing the current working population, the relative wage share will not be affected by the increase in the rate of unemployment. However, if the increased rate of unemployment depresses the real wage rate holding the current level of employment constant, then the relative wage share will decrease. (b) If the rate of unemployment increases as a result of a decrease in the level of employment, the relative wage share will decrease or increase depending upon the elasticity of real wage rate and the elasticity of real output with respect to employment.[4]

Fourth, the growth rate of real GNP is often regarded as a proxy for the rate of profit. That is, when the growth rate of real GNP is high, the rate of profit is also high. In such a case, the relative wage share will decrease as the growth rate of real GNP increases. However, if the growth rate of real GNP is a proxy for the growth rate of demand for labor, the relative wage share will increase as the growth rate of real GNP increases.

Fifth, the lagged dependent variable is included to observe the effect of the lagged dependent variable on the relative wage share. An economic

(4) Let the relative wage share be

$$k=\frac{wN}{Q} \tag{a}$$

where k=the relative wage share, w=the real wage rate, N=employment, Q=real output. Further assume that $Q=F(N,K)$, $\partial Q/\partial N=Q'$, $\partial w/\partial N=w'$, where K=capital.

Case I. The real wage rate is constant, $w=\bar{w}$.

Differentiating equation (a) with respect to N,

$$\frac{\partial k}{\partial N}=\frac{wQ-wNQ'}{Q^2}. \tag{b}$$

Multiplying by $QN/wN=N/k$ both sides of equation (b),

$$\frac{\partial k}{\partial N}\cdot\frac{N}{k}=1-\frac{\partial Q}{\partial N}\cdot\frac{N}{Q}. \tag{c}$$

Case II. The real wage rate is a function of employment, $w=F(N,K)$, $\partial w/\partial N=w'$.

Differentiating equation (a) with respect to N,

$$\frac{\partial k}{\partial N}=\frac{(w'N+w)Q-Q'wN}{Q^2}. \tag{d}$$

Multiplying by $QN/wN=N/k$ both sides of equation (d),

$$\frac{\partial k}{\partial N}\cdot\frac{N}{k}=1+\frac{\partial w}{\partial N}\cdot\frac{N}{w}-\frac{\partial Q}{\partial N}\cdot\frac{N}{Q}. \tag{e}$$

Case III. The real wage rate, employment and output are independent of each other, but they are functions of time.

Differentiating equation (a) with respect to time t, we derive

$$\Delta k/k=\Delta w/w+\Delta N/N-\Delta Q/Q. \tag{f}$$

Equation (f) shows that the relative wage share will decrease if the rate of increase in employment is negative.

interpretation of the lagged dependent variable is that workers will wish to increase their relative wage share relative to the preceding year's relative wage share.[5]

V. The Regression Results

With the above variables and by the method of ordinary least squares, a large number of regression equations were calculated. Some selected regression results are summarized in Tables 8-13. Tables 8-10 are for the period 1945~77, and Tables 11-13 are for the period 1948~77. The following points may be noted.

(1) For 1945~77, in Table 8, we note that the percent of wage and salary workers (N/E) has positive signs and they are significant in all equations. The rate of inflation ($\Delta P/P$) has negative signs and significant in most equations. The rate of unemployment (U) has mixed signs, positive and significant signs for the TC/NY ratio but negative signs for other labor shares. The rate of real GNP growth rate ($\Delta Q/Q$) has also mixed signs, positive and significant signs for the TC/NY ratio and the WS/NY ratio, and negative and significant signs for the TC/PY ratio and the WS/PY ratio. The lagged dependent variables have positive and significant signs. However, the DW statistics and the h statistics suggest serial correlations for the TC/PY ratio and the WS/PY ratio.

(2) In order to examine a possible lag structure, we have introduced one year of time lag to all independent variables(Table 9). Again, the percent of wage and salary workers (N/E) has positive signs and is significant in most equations except for the WS/PY ratio. The rate of inflation has negative signs in all equations, they are significant in most equations except for the TC/NY ratio. The rate of unemployment has mixed signs but they are significant in some equations. The rate of real GNP growth rate has again mixed signs. The lagged dependent variables have positive signs and they are all significant. The lagged model suggests that the lagged rate of inflation is not significant for all four types of relative wage share. The h statistics indicate no serial

(5) The simple correlation coefficients of $\Delta Q/Q$ with the lagged TC/NY, WS/NY, TC/PY, and WS/PY ratios were 0.078, −0.078, −0.112, and −0.301 during 1945~77. For 1948~77, the correlation coefficients were −0.208, −0.284, −0.377*, and −0.354*. (*Significant at the 5% level.)
The simple correlation coefficients of U with the lagged TC/NY, WS/NY, TC/PY, and WS/PY ratios were 0.615**, 0.068, and 0.353* for 1945~77, and 0.568**, 0.497**, 0.072 and 0.330 for 1948~77. (** Significant at the 1% level.)

Table 8. The Relative Wage Share (1945～77)

	Intercept	N/E	$\Delta P/P$	U	$\Delta Q/Q$	$(W/Y)_{t-1}$	R	$\bar{R}^2$	F	SEE	DW	h
(1) TC/NY (71.12)	18.2555 (84.40)	0.6287 (15.08)*					0.9381	0.8761	227.31	1.24	0.8543	
(2)	18.3931 (83.85)	0.6259 (14.59)*	0.0241 (0.38)				0.9384	0.8726	110.58	1.26	0.8747	
(3)	20.0802 (102.91)	0.5797 (14.08)*	0.0310 (0.54)	0.4406 (2.99)*			0.9532	0.8992	96.14	1.12	0.9927	
(4)	17.2936 (102.07)	0.6235 (16.31)*	−0.0482 (−0.87)	0.4042 (3.14)*	−0.1508 (−3.24)		0.9662	0.9240	98.25	0.97	1.4330	
(5)	7.9800 (52.23)	0.3890 (4.20)*	−0.0501 (−1.01)	0.0765 (0.46)	−0.1009 (−2.20)*	0.4309 (2.73)*	0.9736	0.9382	98.15	0.88	2.0876	−0.321
(6) WS/NY (65.18)	48.3291 (250.05)	0.2005 (5.38)*					0.6949	0.4662	28.95	1.11	0.8697	
(7)	47.9431 (249.86)	0.2082 (5.55)*	−0.0675 (−1.21)				0.7119	0.4739	15.41	1.10	0.9236	
(8)	47.8774 (245.38)	0.2100 (5.10)*	−0.0678 (−1.19)	−0.0171 (−0.12)			0.7121	0.4560	9.94	1.12	0.9275	
(9)	45.2029 (262.97)	0.2520 (6.50)*	−0.1438 (−2.57)*	−0.0521 (−0.40)	−0.1447 (−3.06)*		0.7941	0.5778	11.95	0.99	1.2350	
(10)	21.8744 (144.39)	0.1552 (3.31)*	−0.0901 (−1.72)*	−0.1951 (−1.57)	−0.0821 (−1.76)*	0.4886 (3.01)*	0.8505	0.6721	14.21	0.87	2.0502	−0.399
(11) TC/PY (70.17)	47.9148 (197.82)	0.2647 (5.67)*					0.7134	0.4931	32.13	1.39	0.8152	
(12)	46.4580 (247.58)	0.2938 (8.00)*	−0.2547 (−4.65)*				0.8455	0.6958	37.59	1.08	1.5951	
(13)	44.5344 (305.76)	0.3464 (11.27)*	−0.2627 (−6.18)*	−0.5023 (−4.56)*			0.9132	0.8167	48.53	0.84	1.7476	
(14)	44.8503 (303.53)	0.3414 (10.24)*	−0.2537 (−5.27)*	−0.4982 (−4.44)*	0.0171 (0.42)		0.9138	0.8114	35.41	0.85	1.6720	
(15)	24.0734 (183.39)	0.1619 (2.37)*	−0.0792 (−1.08)	−0.3261 (−2.81)*	0.1504 (2.58)*	0.4840 (2.91)*	0.9351	0.8511	37.59	0.75	2.3807	−3.686

Table 8. (Continued)

		Intercept	N/E	$\Delta P/P$	U	$\Delta Q/Q$	$(W/Y)_{t-1}$	R	$\bar{R}^2$	F	SEE	DW	h
(16)	WS/PY	64.7394	0.0287					0.0915	−0.0236	0.26	1.67	0.6803	
	(67.15)	(222.90)	(0.51)										
(17)		63.1713	0.0599	−0.2741				0.5859	0.2995	7.84	1.38	1.2363	
		(262.93)	(1.28)	(−3.91)*									
(18)		60.2961	0.1386	−0.2860	−0.7508			0.8468	0.6878	24.50	0.92	1.6073	
		(375.92)	(4.09)*	(−6.11)*	(−6.19)*								
(19)		60.2955	0.1386	−0.2861	−0.7509	−0.00003		0.8468	0.6767	17.74	0.94	1.6074	
		(369.38)	(3.76)*	(−5.38)*	(−6.06)*	(−0.0007)							
(20)		27.8719	0.0422	−0.0699	−0.4199	0.1604	0.5587	0.8918	0.7574	20.98	0.81	2.3185	−27.312
		(197.10)	(0.96)	(−0.86)	(−2.82)*	(2.53)*	(3.21)*						

Note: * indicates that the regression coefficient is significant at the 5% level or less. The numbers in the parentheses below the regression coefficients are the t-ratios. The numbers in the parentheses below the dependent and independent variables are their mean values. The Durbin's h statistic was calculated by the following: $h=(1-DW/2)\sqrt{N/(1-NV(Y_{t-1}))}$ where DW= the Durbin-Watson test statistic, N= the number of observations, $V(Y_{t-1})$=the variance of the lagged dependent variable. n.a. indicates that the h statistic is not applicable due to a negative number in the radical.

Table 9. The Relative Wage Share (1945~77) (One Year of Time Lag)

		Intercept	$(N/E)_{t-1}$	$(\Delta P/P)_{t-1}$	U_{t-1}	$(\Delta Q/Q)_{t-1}$	Lagged dependent $(t-1)$	R	$\bar{R}^2$	F	DW	SEE	h
(1)	TC/NY	16.5529	0.6518	−0.0305	0.0563	−0.0448		0.9680	0.9279	104.00	1.0055	0.9477	
	(71.12)	(100.33)	(17.47)*	(−0.57)	(0.46)	(−0.99)							
(2)		8.0665	0.3546	−0.0038	−0.1199	0.0307	0.4785	0.9759	0.9435	107.81	2.0804	0.8394	−0.635
		(0.35)	(3.34)*	(−0.08)	(−0.97)	(0.65)	(2.95)*						
(3)	WS/NY	45.0121	0.2646	−0.0940	−0.3199	−0.0343		0.8110	0.6089	13.45	0.8949	0.9504	
	(65.18)	(272.06)	(7.07)*	(−1.74)*	(−2.61)*	(−0.76)							
(4)		21.7097	0.1320	−0.0235	−0.3066	0.0384	0.5201	0.8683	0.7083	16.54	2.1463	0.8208	−1.068
		(151.94)	(2.53)*	(−0.46)	(−2.89)*	(0.85)	(3.25)*						
(5)	TC/PY	49.1520	0.2672	−0.1878	−0.1813	0.0926		0.8193	0.6243	14.30	2.0869	1.1979	
	(70.17)	(235.71)	(5.67)*	(−2.75)*	(−1.17)	(1.63)							
(6)		34.8353	0.1611	−0.1047	−0.0005	0.0921	0.3136	0.8318	0.6348	12.12	2.2439	1.1811	n.a.
		(169.43)	(1.76)*	(−1.15)	(−0.002)	(1.64)	(1.34)						
(7)	WS/PY	64.6695	0.0604	−0.2154	−0.4152	0.0852		0.6689	0.3685	5.67	1.9404	1.3104	
	(67.15)	(283.48)	(1.17)	(−2.89)*	(−2.45)*	(1.37)							
(8)		36.4271	−0.0042	−0.0809	−0.0437	0.0896	0.4655	0.7181	0.4259	5.75	2.1595	1.2495	n.a.
		(167.48)	(−0.07)	(−0.82)	(−0.17)	(1.15)	(1.95)*						

correlation for Equations (2) and (4), but they are not applicable for Equations (6) and (8).

(3) Table 10 shows the results obtained with variables in first differences. The results are very similar to the previous results for the four independent variables. The percent of wage and salary workers has positive signs in all four equations, but they are significant only for the TC/PY ratio. The rate of inflation has negative signs in all equations, but they are significant only for the TC/PY and WS/PY ratios. The rate of unemployment has positive signs for the TC/NY and WS/NY ratios, but it has negative signs for the TC/PY and WS/PY ratios. The rate of real GNP growth has negative signs for the TC/NY and WS/NY ratios, but it has positive signs for the TC/NY and WS/NY ratios, and the signs are all significant at the 5% level. The DW statistics indicate no serial correlation.

(4) Since there might have been some extraordinary disturbances and sampling errors during immediate aftermath of World War II, we have recalculated regression equations, excluding the immediate aftermath, for 1948~77. The results are summarized in Tables 11-13. We note that the results are very similar particularly for the percent of wage and salary workers and the rate of inflation. The percent of wage and salary workers has mostly positive signs and is significant at the 5% level except in Table 13. The rate of inflation has negative signs in most equations and they are significant. Positive and significant signs are seen for the TC/NY and WS/NY ratios in the lagged model of Table 12. The rate of unemployment has negative signs and significant in most equations except for the TC/NY ratio in Tables 11 and 12. The rate of real GNP growth has negative signs in most equations except in the lagged model of Table 12. The negative and significant signs for the TC/PY and WS/PY

Table 10. The Relative Wage Share (1945~77) (First Differences)

	Intercept	$\Delta\left(\frac{N}{E}\right)$ (0.43)	$\Delta\left(\frac{\Delta P}{P}\right)$ (0.13)	ΔU (0.15)	$\Delta\left(\frac{\Delta Q}{Q}\right)$ (0.19)	R	$\bar{R}^2$	F	DW	SEE
(1)Δ(TC/NY)	0.0713	0.4272	−0.0435	0.0350	−0.0974	0.4704	0.1110	1.99	2.5425	1.0234
	(0.24)	(0.40)	(1.31)	(−0.75)	(0.14)	(−2.29)*				
(2)Δ(WS/NY)	−0.1982	0.4793	−0.0514	0.0859	−0.0773	0.4419	0.0803	1.70	2.6639	0.9929
	(0.00)	(−1.15)	(1.55)	(−0.91)	(0.35)	(−1.88)*				
(3)Δ(TC/PY)	−0.2906	0.7456	−0.1109	−0.2140	0.0728	0.9245	0.5398	10.38	3.0625	0.9245
	(−0.003)	(−1.81)	(2.58)*	(−2.11)*	(−0.93)	(1.90)*				
(4)Δ(WS/PY)	−0.4300	0.7466	−0.1107	−0.2278	0.0657	0.7671	0.5297	10.01	3.1252	0.9331
	(−0.15)	(−2.65)	(2.56)*	(−2.09)*	(−0.98)	(1.70)*				

Table 11. The Relative Wage Share (1948~77)

	Intercept	N/E	$\Delta P/P$	U	$\Delta Q/Q$	$(W/Y)_{t-1}$	R	$\bar{R}^2$	F	SEE	DW	h
(1) TC/NY (71.53)	15.0341 (66.62)	0.6655 (13.92)*					0.9347	0.8692	193.70	1.24	0.7954	
(2)	14.4176 (62.82)	0.6737 (11.61)*	−0.0243 (−0.26)				0.9349	0.8647	93.66	1.26	0.7796	
(3)	14.8497 (83.70)	0.6333 (13.83)*	−0.0284 (−0.39)	0.5914 (4.38)*			0.9631	0.9192	110.90	0.97	1.0780	
(4)	16.1394 (106.55)	0.6336 (16.21)*	−0.0579 (−0.93)	0.4909 (4.11)*	−0.1938 (−3.27)*		0.9743	0.9411	116.76	0.83	1.0932	
(5)	8.0397 (62.36)	0.3405 (3.54)*	−0.0419 (−0.79)	0.0302 (0.17)	−0.2052 (−4.05)*	0.4959 (3.24)*	0.9822	0.9573	131.06	0.71	1.5290	2.366
(6) WS/NY (65.33)	47.8349 (232.20)	0.2061 (4.72)*					0.6657	0.4233	22.29	1.13	0.7351	
(7)	45.0600 (221.65)	0.2432 (4.73)*	−0.1093 (−1.32)				0.6907	0.4384	12.32	1.11	0.8052	
(8)	45.0998 (218.20)	0.2395 (4.49)*	−0.1097 (−1.31)	0.0545 (0.35)			0.6925	0.4195	7.98	1.13	0.7959	
(9)	47.0220 (312.17)	0.2398 (6.17)*	−0.1537 (−2.49)*	−0.0953 (−0.80)	−0.2889 (−4.89)*		0.8569	0.6917	17.27	0.83	0.7799	
(10)	21.4998 (198.52)	0.1165 (3.11)*	−0.0800 (−1.71)*	−0.2976 (−3.15)*	−0.2454 (−5.66)*	0.5609 (4.94)*	0.9317	0.8406	31.59	0.59	1.3660	2.217
(11) TC/PY (70.50)	52.2316 (248.66)	0.2151 (4.83)*					0.6744	0.4354	23.36	1.15	0.3909	
(12)	45.7916 (258.82)	0.3012 (6.74)*	−0.2538 (−3.53)*				0.7919	0.5994	22.70	0.97	1.0001	
(13)	45.4467 (341.52)	0.3335 (9.71)*	−0.2505 (−4.63)*	−0.4720 (−4.66)*			0.8927	0.7734	33.99	0.73	0.8784	
(14)	46.1854 (374.55)	0.3336 (10.48)*	−0.2674 (−5.28)*	−0.5296 (−5.45)*	−0.1110 (−2.30)*		0.9123	0.8054	31.01	0.68	0.9302	
(15)	21.0717 (230.16)	0.1235 (2.41)*	−0.0864 (−1.59)*	−0.3776 (−4.76)*	0.0328 (0.69)	0.5833 (4.62)*	0.9546	0.8928	49.28	0.50	2.0653	−0.248

Table 11. (Continued)

	Intercept	N/E	$\Delta P/P$	U	$\Delta Q/Q$	$(W/Y)_{t-1}$	R	$\bar{R}^2$	F	SEE	DW	h
(16) WS/PY (67.29)	69.2015 (256.26)	−0.0226 (−0.39)					0.0743	−0.0300	0.16	1.48	0.3544	
(17)	62.0434 (258.14)	0.0731 (1.20)	−0.2820 (−2.89)*				0.4903	0.1841	4.27	1.32	0.8395	
(18)	61.5014 (401.64)	0.1238 (3.13)*	−0.2769 (−4.45)*	−0.7417 (−6.37)*			0.8385	0.6688	20.52	0.84	0.9463	
(19)	62.5981 (475.81)	0.1240 (3.65)*	−0.3020 (−5.59)*	−0.8272 (−7.98)*	−0.1648 (−3.20)*		0.8884	0.7555	23.41	0.72	1.0368	
(20)	27.2845 (289.14)	0.0313 (1.02)	−0.1008 (−1.80)*	−0.5084 (−5.17)*	0.0099 (0.19)	0.5979 (4.96)*	0.9465	0.8742	41.31	0.52	2.1559	−0.568

Table 12. The Relative Wage Share (1948～77) (One Year of Time Lag)

	Intercept	$(N/E)_{t-1}$ (84.43)	$(\Delta P/P)_{t-1}$ (3.29)	U_{t-1} (4.92)	$(\Delta Q/Q)_{t-1}$ (3.38)	Lagged dependent $(t-1)$	R	$\bar{R}^2$	F	DW	SEE	h
(1) TC/NY (71.53)	16.4165 (98.88)	0.6370 (15.17)*	0.0549 (0.80)	0.2165 (1.75)*	0.0272 (0.45)		0.9690	0.9292	96.14	0.8292	0.9094	
(2)	4.0942 (32.26)	0.1844 (1.69)	0.0979 (1.83)*	−0.1061 (−0.88)	0.1823 (3.12)*	0.7226 (4.33)*	0.9827	0.9586	135.34	1.4809	0.6952	3.505
(3) WS/NY (65.33)	45.4890 (237.19)	0.2519 (5.19)*	−0.0453 (−0.57)	−0.2500 (−1.75)*	−0.0139 (−0.20)		0.7544	0.5002	8.26	0.6345	1.0505	
(4)	2.6543 (22.05)	0.0040 (0.08)	0.0995 (1.81)*	−0.2676 (−2.98)*	0.2117 (3.73)*	0.9592 (6.28)*	0.9149	0.8031	24.65	1.8232	0.6594	0.884
(5) TC/PY (70.50)	47.3005 (270.85)	0.2898 (6.56)*	−0.2324 (−3.22)*	−0.1879 (−1.45)	0.1228 (1.93)*		0.8146	0.6097	12.33	1.2934	0.9565	
(6)	16.8176 (135.30)	0.0189 (0.30)	−0.0334 (−0.52)	0.0454 (0.44)	0.1283 (2.83)*	0.7324 (5.03)*	0.9145	0.8023	24.54	2.4165	0.6808	−1.891
(7) WS/PY (67.29)	62.6126 (306.24)	0.0865 (1.67)	−0.2704 (−3.20)*	−0.4282 (−2.81)	0.1088 (1.46)		0.7007	0.4095	6.03	1.3092	1.1199	
(8)	15.3793 (118.07)	−0.0562 (−1.39)	−0.0190 (−0.28)	0.0276 (0.23)	0.1336 (2.80)*	0.8339 (6.13)*	0.8954	0.7604	19.40	2.4899	0.7134	−2.012

Table 13. The Relative Wage Share (1948~77) (First Differences)

	Intercept	$\Delta\left(\frac{N}{E}\right)$ (0.47)	$\Delta\left(\frac{\Delta P}{P}\right)$ (0.14)	ΔU (0.17)	$\Delta\left(\frac{\Delta Q}{Q}\right)$ (0.21)	R	$\bar{R}^2$	F	DW	SEE
(1)Δ(TC/NY)	0.3936	0.0239	−0.1208	−0.4199	−0.2697	0.8469	0.6720	15.85	1.4941	0.6986
(0.26)	(3.09)	(0.10)	(−2.47)*	(−2.58)*	(−7.52)*					
(2)Δ(WS/NY)	0.0721	0.1125	−0.1209	−0.3310	−0.2482	0.8517	0.6814	16.50	1.6038	0.6380
(0.00)	(0.62)	(0.51)	(−2.71)*	(−2.22)*	(−7.57)*					
(3)Δ(TC/PY)	0.0470	0.2548	−0.1701	−0.7214	−0.1165	0.8870	0.7527	23.07	2.1342	0.5552
(−0.003)	(0.46)	(1.33)	(−4.38)*	(−5.57)*	(−4.09)*					
(4)Δ(WS/PY)	−0.1122	0.2703	−0.1740	−0.7347	−0.1263	0.8909	0.7606	24.04	2.1693	0.5594
(−0.16)	(−1.10)	(1.40)	(−4.45)*	(−5.63)*	(−4.39)*					

ratios are inconsistent with the results of Table 10. Finally, the lagged dependent variables have positive signs and they are all significant. The DW statistics and the h statistics indicate serial correlation for the TC/NY and WS/NY ratios in Table 11, the TC/NY, TC/PY, and WS/PY ratios in Table 12. The DW statistics for the Δ(TC/NY) and Δ(WS/NY) ratios indicate inconclusive serial correlations.

(5) In the above, we have seen that the regression results vary with the model and the period of observation. If we evaluate a model in terms of the DW statistic or the h statistic, the following regression results are reliable or free from serial correlation: the TC/NY and WS/NY ratios, Equations (5) and (10) of Table 8; the TC/NY and WS/NY ratios, Equations (2) and (4) in Table 9; all equations in Table 10, i.e., the regression equations in first differences; the TC/NY and WS/NY ratios, Equations (15) and (20) in Table 11; the WS/NY ratio, Equation (4) in Table 12; the Δ(TC/PY) and Δ(WS/PY) ratios, Equations (3) and (4) in Table 13. Based on only these equations, the following propositions may be stated:

(a) For the TC/NY ratio, the percent of wage and salary workers, the growth rate of real GNP and the lagged dependent variables are significant. When the percent of wage and salary workers increases, the TC/NY ratio increases, and when the growth rate of real GNP increases, the TC/NY ratio tends to fall (Equation (5) in Table 8).

(b) For the WS/NY ratio, the significant variables are the percent of wage and salary workers, the rate of inflation, the growth rate of real GNP, and the lagged dependent variables. When the percent of wage and salary workers increases, the WS/NY ratio tends to increase. When the rate of inflation, the

rate of unemployment and the rate of real GNP growth increase, the WS/NY ratio tends to fall (Equation (10) in Table 8).

(c) For the TC/PY ratio, the significant variables are the percent of wage and salary workers, the rate of inflation, the rate of unemployment, and the lagged labor share. When the percent of wage and salary workers increases, the TC/PY ratio tends to increase, and when the rate of inflation, the rate of unemployment and the lagged variable increase, the TC/PY ratio tends to rise (Equation (15) in Table 11).

(d) For the WS/PY ratio, the significant variables are the rate of inflation, the rate of unemployment and the lagged relative wage share. When the rate of inflation and the rate of unemployment increase, the WS/PY ratio tends to fall (Equation (20) in Table 11).

(e) When all the independent variables were lagged by one year, the performance of the model did not improve. The signs and significance of the coefficients were very similar to the previous results except for one equation for the WS/NY ratio (Equation (4) in Table 12). The rate of inflation and the rate of real GNP growth both have positive and significant signs in Equation (4), Table 12 whereas they both have negative and significant signs in Equation (10), Table 8.

(f) The regression results obtained with variables in first differences show the following: The rate of inflation and the rate of unemployment both tend to reduce the four types of labor shares if other conditions are the same. The rate of real GNP growth has mixed signs. It has positive signs for the 1945 ~77 data, wheras it has negative signs for the 1948~77 data.

(g) In effect, the regression results obtained with variables in current values, in lagged values and in first differences tend to show that inflation tends to decrease the relative wage share be it measured by TC/NY, WS/NY, TC/PY and WS/PY. These results do not support the classical theory, the monetarists' and the expectationists' hypotheses, but rather support the wage-lag hypothesis, the Keynesian theory, and the Phillips curve hypothesis. It should be noted that the decrease in the relative wage share does not necessarily mean decrease in the level of employment, or decrease in the absolute income of labor. This is illustrated in Figure 3 with the conventional marginal product of labor curve. The initial equilibrium employment is at L_1, and the initial real wage rate is w_2. When the real wage rate falls as a result of an increase in the level of prices, employment increases to L_2 and the real wage rate falls to w_1.

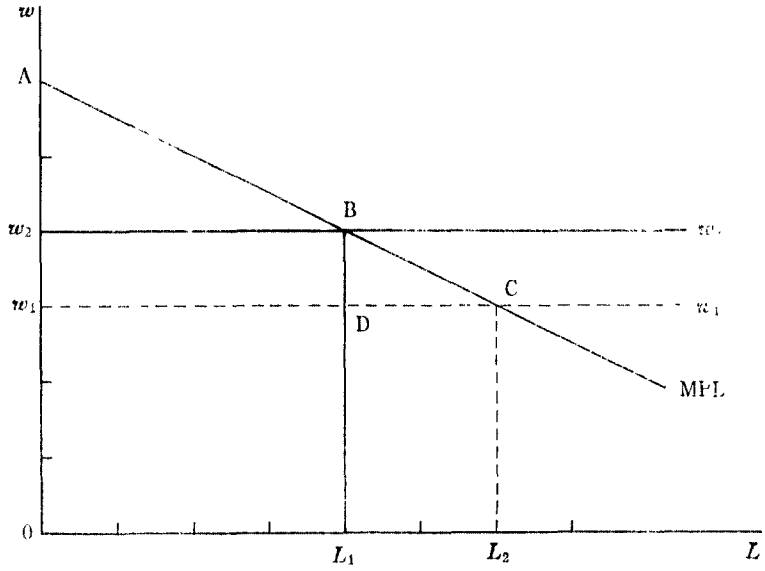

Fig. 3. Relative and Absolute Labor Share

The share of labor increases from OL_1Bw_2 to OL_2Cw_1, but the relative labor share is decreased from 16/(16+4)=0.8 to 18/(18+9)=0.67.

VI. Summary and Conclusions

From the above observations, we may summarize the following points:

First, whether the relative labor share has increased, decreased, or remained constant depends upon the definition of the labor share. We have seen that the TC/NY ratio has increased from 68.2% to 76% during 1945~77. However, the other three types of labor shares, namely, WS/NY, TC/PY and WS/PY either remained constant, or decreased slightly. That is, WS/NY remained constant at 65.1%, TC/PY decreased slightly from 70.3% to 70.2%, and WS/PY decreased from 69.2% to 64.4% during the period. This implies that the relative non-labor share in national income decreased from 31.8% to 24%, while the relative non-labor share in personal income has increased from 30.8% to 35.6%. (6)

(6) National income consists of the following shares: (1) wages and salaries, (2) supplements to wages and salaries, (3) proprietors' income with inventory valuation and capital consumption

Second, the most significant single variable that explains the long-term and the cyclical fluctuations in the relative labor share is the percent of wage and salary workers except for the WS/PY ratio. For instance, it explains about 88% of the total variation in the TC/NY ratio during 1945~77, and 87% of the variation during 1948~77. These results support Brown and Hart's [1] and Johnson's [6] hypotheses that were discussed in section IV.

Third, the negative and significant signs of the rate of inflation in most regression equations support the wage-lag hypothesis, the Keynesian theory, and the Phillips curve hypothesis, which maintain that inflation can affect the real wage rate, employment and real output. However, the regression results do not support the classical theory, the monetarists 'and the expectationists' hypotheses that inflation cannot affect the real wage, employment and real output in the long run, or very often even in the short run.

Fourth, the regression results suggest that the rate of unemployment tends to reduce the relative wage share, if other conditions are the same.

Fifth, the effect of the growth rate of real GNP is not conclusive because the signs varied with the period of observation.

Finally, it should be mentioned that there are some important questions concerning the relative wage share, though they are not discussed in this paper. For instance, (1) Is the relative wage share related to personal size income distribution? (2) If it is, and if the rate of inflation reduces the relative wage share, does it imply that inflation increases inequality in income distribution? Statistical results show that inflation tends to reduce income inequality, though inflation tends to reduce the relative wage share. These results are discussed in other papers.[7]

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adjustments (farm and nonfarm), (4) rental income of persons with capital consumption adjustment, (5) corporate profits with inventory valuation and capital consumption adjustments, and (6) net interest.

Personal income consists of the following shares: (1) wages and salary disbursements, (2) other labor income, (3) proprietors' income with inventory valuation and capital consumption adjustments (farm and nonfarm), (4) rental income of persons with capital consumption adjustment, (5) dividends, (6) personal interest income, (7) transfer payments (old age, survivors, disability, and health insurance benefits; government unemployment insurance benefits; veterans benefits, government employee retirement benefits, aid to families with dependent children, and others), less (8) personal contributions for social insurance. (*Economic Report of the President*, 1978, pp. 278-281.)

(7) This paper is Part I of my three-part study of income distribution, and was presented at

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