Testing Labour Value Theory with input/output tables

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Abstract

The paper describes an attempt to use the British Input Output tables and other computer readable British Economic statistics to test hypotheses about the labour theory of value.

Inversion of the I/O matrices is used to obtain estimates of values for commodity groups and the correlations between these and prices are computed. The results show a very high level of correlation between values and prices.

1 PREVIOUS ESTIMATES

Statistical measurement of the economic indices of Marxist political economy was pioneered during the 1950s by Gillman[1] who used national income figures to obtain estimates of the rate of surplus value, organic composition of capital and rate of profit for the British economy. The measurements presented in this paper draw on his methodology.

By the 1970s the empirical reality of a falling rate of profit in Britain drew attention both from orthodox[2] and Marxist economists. Among the latter the most notable contribution came from Glyn and Suttcliffe[3]. Instead of using classical measures they used surrogate measures such as the Wage Ratio and the Share of Profits in company product.

These seemed to show the rate of exploitation to be declining, perhaps in consequence of union power. Whereas Gillman had distinguished in his estimates of the rate of surplus value between productive and unproductive labour, following Marx[4], the categories used by Glyn and Sutcliffe aggregated all wage incomes. This could mask an actual increase in the exploitation of productive workers behind a change from productive to unproductive labour. This objection was raised by Bullock and Yaffe[5] who used a comparison of the rates of change of take home pay and of productivity to indicate that the rate of relative surplus value had risen over the same period. The same conclusion was arrived at on different grounds by Bacon and Eltis[6], whose analyses of the share of purchases by the non-industrial sector, led them to conclude that the main problem of the British economy was the shift from productive to unproductive employment. This, they said was the primary cause of the decline in profitability.

In section 3 we will present evidence using Gillman's technique that supports these critics of Glyn and Sutcliffe.

2 JUSTIFICATION OF THE TECHNIQUE

Marx did not hesitate to use empirical data to measure the rate of surplus value. He estimated[7], using the prevailing wage rates, costs of constant capital and final selling price for No. 32 yarn, that the rate of surplus value in the Manchester cotton industry in 1871 was 154%, and that the rate in wheat farming in 1815 was just over 100%[8]. Throughout the first volume of Capital, he constantly uses official statistics and factory inspectors reports to justify his theoretical claims. When dealing with the production of absolute surplus value he produces statistics comparing the production of absolute surplus labour in industrial England with feudal Romania. When dealing with the concentration of capital he uses Income Tax statistics to document the concentration of wealth.

Given the limitations of the then existing official statistics, however, it was not possible to estimate the average rate of surplus value for the whole economy. Only with the publication of National Income statistics in the 20th century did this become practicable.

It may be excepted that the national income statistics are given in price terms not value terms, and that their use for calculating Marxian categories could be invalid.

We believe such fears to be unfounded. We argue this on the grounds of dimensional analysis, the artificiality of the objection and empirical validation of the concepts we use.

Dimensional Analysis

In what follows we will use the standard notation with the set of symbols $\{c,v,s\}$ standing respectively for constant capital, variable capital and surplus value.

If one had National Income figures in value terms, these variables would be measured in millions of person hours per annum. This would give them the dimension $\mathbf{t}_x\mathbf{h}_x\mathbf{t}^{-1}$ where **t** stands for time and **h** for humans. Cancelling the time terms, the resulting dimension is **h**, or so many million people. This may seem unexpected, but it means that *s,c,v,* measure the number of full time person equivalents employed on the production of consumer goods(*v*), the reproduction of constant capital (*c*) and on the production of luxuries, new capital goods etc (*s*). The value variables *s,c,v* measure the size and activity distribution of the workforce.

The main ratios of interest $s' = s/v$ = rate of surplus value, $p' = s/(c+v)$ = rate of profit on a flow basis, and $o' = c/v$ = organic composition of capital, are all dimensionless numbers. For example s' is of dimension $\mathbf{h}\times\mathbf{h}^{-1}$ which cancels out.

In the case of actual National Income figures, by appropriate choice of categories we can arrive at a monetary estimate of *s* in terms of £million per annum or dimension **£t**$^{-1}$. Similar arguments apply to *c* & *v*,but computing the ratios *s',o',p'* will again yield dimensionless numbers. Hence on purely dimensional grounds there is no contradiction in extimating these ratios from monetary magnitudes.

There are a couple of other interesting ratios:

1. The rate of profit on a stock basis, $p'_s = s/(k+Tv)$, where *k* is the stock of constant capital and *T*, is the turnover time of variable capital.
2. The organic composition on a stock basis, $o'_s=k/(Tv)$.

The dimension of *k* in value terms is millions of person hours, or **ht** and clearly, *Tv* is also of dimension **ht**. The resulting dimension of p'_s is **t**$^{-1}$. This is what one would expect since the rate of profit in stock terms measures the expansion of capital values per unit time. The organic composition on a stock basis is again a dimensionless quantity. Monetary calculation likewise gives us a rate of profit as %per annum which is **t**$^{-1}$ and a dimensionless number for o'_s.

Since monetary ratios are dimensionally compatible with the value ratios, using the former as an estimate of the latter is legitimate provided that the monetary measures s_m,v_m, c_m are approximated by linear functions of the corresponding value measures s_l,v_l, c_l with positive slope and intercepts at the origin.

Value versus Price Data

Are values linear approximations of prices and *vice-versa?*

This has been questioned[9] [10] by authors basing themselves on Sraffa[11], but we consider that their arguments are unconvincing. It has been shown [12] [13] that the examples purporting to demonstrate profit and surplus value to be anti-correlated rest on highly artificial assumptions. In particular, negative labour `values' can arise only in systems that are inefficient in the sense that they are not on the production possibility frontier. In such circumstances the labour `values' calculated do not correspond to the definition of socially necessary labour. Such occurrences would be highly unstable and improbable in a real capitalist economy.

The construction of such forced examples is of little scientific, as opposed to ideological, value.

Shaik has argued[14] that the question of whether prices are closely correlated with values is essentially an empirical one. One can in principle measure the degree of correlation between the two provide that one has independent measures of each. Shaik's method uses input-output table data to estimate labour contents and then measures the correlation between these and prices. He presents results derived from Italian and US input-output tables. These show, as one would expect from value theory, that relative prices are almost entirely determined by labour content. He obtains correlation coefficients of well over 90%.

It is possible that his results reflect some special feature of the US and Italian economies and that the labour theory of value does not apply in all capitalist economies. Since we are concerned with producing estimates of *s/v* for the UK economy, we have repeated his experiments using the UK input-output tables[15] for 1984. The results are sumarised in Table 1.

Table 1. Regression of prices against values

Estimate	Equation	R^2	maximum error	standard deviation of errors	average absolute error
1.00	price = -.055 + 1.024 labour	0.96	157%	23%	13.5%
2.00	price = -.039 + 1.014 labour	0.98	65.4%	16.5%	11.8%
3.00	price = -.046 + 1.024 labour	0.96	67%	20%	15%
4.00	price = -.049 + 1.024 pr.ofprod.	0.98	57%	15%	10%

The commodity use matrix in Table 4 of the I/O tables was used to provide estimates of total labour content of the outputs of each commodity group. Both direct and indirect labour inputs were calculated using a recursive approximation: $\boldsymbol{l}_{(n)} = c_{l(n-1)} + v_m/w$ where, $\boldsymbol{l}_{(n)}$ is the *n*th estimate of labbour content, $c_{l(n-1)}$ is the labour *n-1*th estimate of the content of constant capital, and *w* is the money wage per hour. Recursion was terminated at a depth of 8 giving answers to 3 significant digits. In the tables, labour input is given in £s. This amounts to measuring the price of the labour power used rather than being a direct measure of the labour used. We tried two alternative methods of going from these figures to estimates of abstract labour.

Our estimates of the regression of prices against values is shown in table 1. The method of calculation for the three estimates was as follows.

1. *Value/price correlation for all industries assuming uniform wage rates.* A dummy wage rate of £1 per hour was assumed to be uniform accross all industries. On this assumption the labour content of the outputs of all industries was calculated. The assumed wage rate was unrealistically low, but this is of no significance in computing the correlations since it is equivalent to a uniform scaling factor in our time unit. In this and all other cases, the variables enter the regressions in logarithmic form.
2. *As above but excluding the oil industry*. Within the figures for all industries there was one with a very anomalously high price/value ratio - the oil industry. This is exactly what one would expect from the Ricardian/Marxian theory of differential rent. Non-marginal oil fields could be expected to sell their output at above its value. Excluding the oil industry from the correlation gave estimate 2.
3. *Values assuming non-uniform wage rates*. In practice wages differ between industries. The actual hourly wage rates for the different industries in 1984 were obtained from the New Earnings Survey and used to convert the monetary figures for direct labour into hours. Again the oil industry was excluded from the final regression.
4. *No oil industry, price of production is independent variable*. Price of production was computed using the recursive application of formula $\boldsymbol{P}_{prod(n)} = p'(c_{pprod(n-1)} + v_m)$ to all industries, where $c_{pprod(n-1)}$ is the *(n-1)*th estimate of the price of production of the constant capital inputs, and $\boldsymbol{P}_{prod(n)}$ is the *n*th estimate of the price of production.

Interpretation of regression results

Two questions arise in looking at the regression results: (1) is labour value an unbiased predictor of money price? and (2) how efficient is labour value as a predictor of money price? The shortstory is that, there appears to be a slight bias, but nonetheless the efficiency is very high.

In the regression of the log of aggregate price on the log of aggregate labour value, sector by sector, the 'ideal' result for the labour theory of value would be if the constant and slope were zero and one respectively. That would say that labour value is an unbiased predictor of money price. In each case the results were pretty close to this ideal, but the constant seems to want to be slightly negative, while the slope differs slightly from unity. If that result is robust, it says there is a slight bias: labour values give an underestimate of price in the case of larger industries (larger, that is, in terms of total labour content), and an overestimate in the case of smaller industries.

On the efficiency of labour value as a predictor of price, there are various indicators. The $\mathbf{R^2}$ gives the percentage of the total variation in the log of price (i.e. sum of squared deviations of the log of price about its mean) that is 'accounted for' by reference to labour values. This is pleasingly high, at about 96 to 98 per cent. One can get more information on this by looking at the residuals (actual money price minus predicted money price, industry by industry).

Since the regressions are logarithmic, these residuals are in percentage form. If the oil industry is dropped the figures improve, although even then there are a few other 'outlier' industries where the discrepancy between actual and predicted price is on the order of 40 per cent. It may be that rent factors are important there too.

It is noticeable that the correction of the labour content figures by using NES data, produces a measure of value that is less efficient as a predictior of price. One possibility is that using the NES data 'over-corrects' the labour content figures. That is, to the extent that wage differentials between industries reflect genuine differences in costs of training etc., they might be taken as 'skill multipliers' and hence might be retained rather than removed in calculating labour content. We suspect, that a large chunk of wage differentials under capitalism have quite different origins, but nonetheless one might expect that class-based differentials would be more significant within industries (different grades of employees) rather than across industries.

The fourth estimate shows that price of production is a slightly more efficient predictor of actual price than value is. This is in conformity with the modifiction to value theory presented by Marx in Capital III[16]. We would expect price of production to predict market price more efficeintly than value does, but, and this is the significant point, prices of production only introduce a minor correction to the underlying determination of market price by labour content. The correction term due to prices of production is so small that it can for practical purposes be ignored. This is especially the case when constructing estimates of ratios like *s/v* where each individual term is an aggregate of many different types of commodities. The term *v* for instance denotes a sum of value that is realised as all of the commodities upon which the wage is spent. Since these will be drawn from many industries, the, already small, random correction terms due to prices of production in each industry, will tend to cancel out. We thus conclude that it is valid to use monetary data from the National Income Statistics to produce estimates of value ratios like *s/v*.

3 OUR ESTIMATES

Our results derived from the National Income and Expediture data of the UK are sumarised in tables 2.1 and 2.2. Let us look first at the time series for the rate of surplus value. This is picked out in more detail in figure 1. The general trend is upwards, rising from 55% in 1970 to 183% at the end of the 1980s. This means that workers have gone from a situation in which they performed 21 minutes per hour unpaid labour, to one in which they performed 38 minutes unpaid labour. The relative division of the working day reversed from a ratio of 1/3 to others and 2/3 to the worker to one where the workers now did 2/3 for others and 1/3 for themselves.

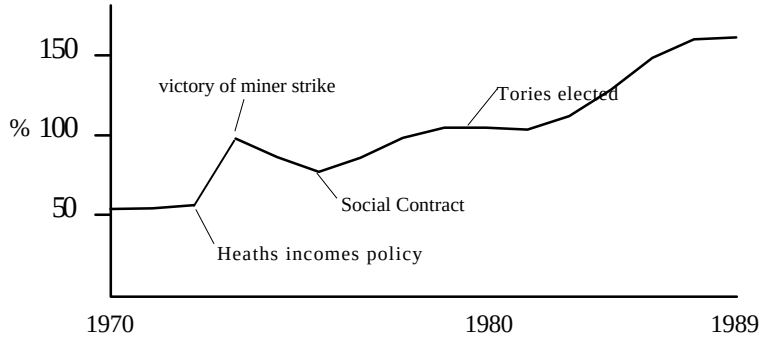

Figure 1 Rate of Surplus value

Within this tendancy, several turning points are visible. Heaths incomes policy was associated with a sharp rise in exploitation which partially reversed after his government was defeated by the miners. A more gradual rise in exploitation followed when the Social Contract was in force between the Labour government and the unions. This rise was temporarily halted by the "winter of discontent", only to resume shortly after the Thatcher government came to power. It then rose remorselessly through the 80's. Although one can no longer identify the effect of short term measures like incomes policies, there are several long term processes which may explain this.

The 80's were a period in which cheap microprocessor technology allowed automation and the use smaller workforces. The consequent increases in productivity are unlikely to have been balanced by a commensurate rise in wages. The resulting displacement of labour by new technology and the decline in established industries has created a large pool of unemployed throughout this period. This will have acted as a downward pressure on wages To the extent that new jobs have been created, the 80's saw an expansion of low paid casual and part time work.

In many sections of the economy, particularly those that have been privatised, both working hours and the intensity of labour have been increased, whilst pay has fallen or at best remained constant. Indeed, contractors have claimed that the whole process of contracting out local authority work would become uneconomic were the EC to prohibit such wage cuts.

Unlike the 1970's, the ability of existing unions to defend working conditions was increasingly compromised by restrictive laws. At the same time their membership declined, both as a result of unemployment and as the shift of the work-force into new firms was been accompanied by a decline in trades union cover.

Many of these factors flowed from a government policy that aimed to change the balance of forces against the working classes. The evidence shows the policies to have succeeded.

By looking at the different categories of income into which the value created by labour flows, we can identify the principle beneficiaries of the rise in exploitation. Figure 2 shows the distribution of the value product, both when the Tories came to power, and a decade after. There has been a shift from wages of productive workers towards profits and unproductive wages. Unproductive

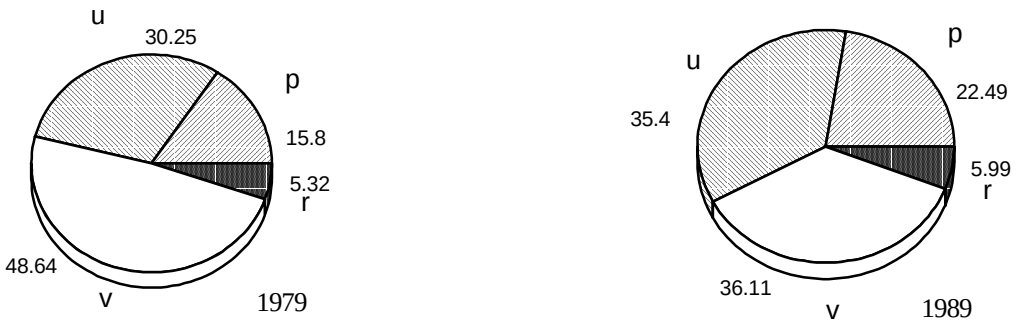

Figure 2. Change in % composition of the value product 1979 to

wages grew from 30% to 35%, a relative rise of 17%.

More significant was the rise in profits, which grew by 6.7% of the net value product, or by 42% of their level at the start of the decade.

A possible explanation for the remarkable rise in the rate of exploitation during the 70s and 80s would be to discount it as a misleading artifact of the way the statistics were calculated.

If one did not accept value theory or the distinction between productive and unproductive labour, one could say: "Of course a decline in manufacturing employment, the traditional core of the 'productive' workforce associated with a rise in employment in banking, financial services and other 'unproductive' sections will, of itself, appear to produce an increase in the rate of exploitation. But this is unreal, since the so-called unproductive sectors are every bbit as much wealth creators as the 'productive' ones."

If this objection were valid, we would expect to see an increasing proportion of the total surplus value going as unproductive wages. As can be seen from Figure 2 , this has not been the case.

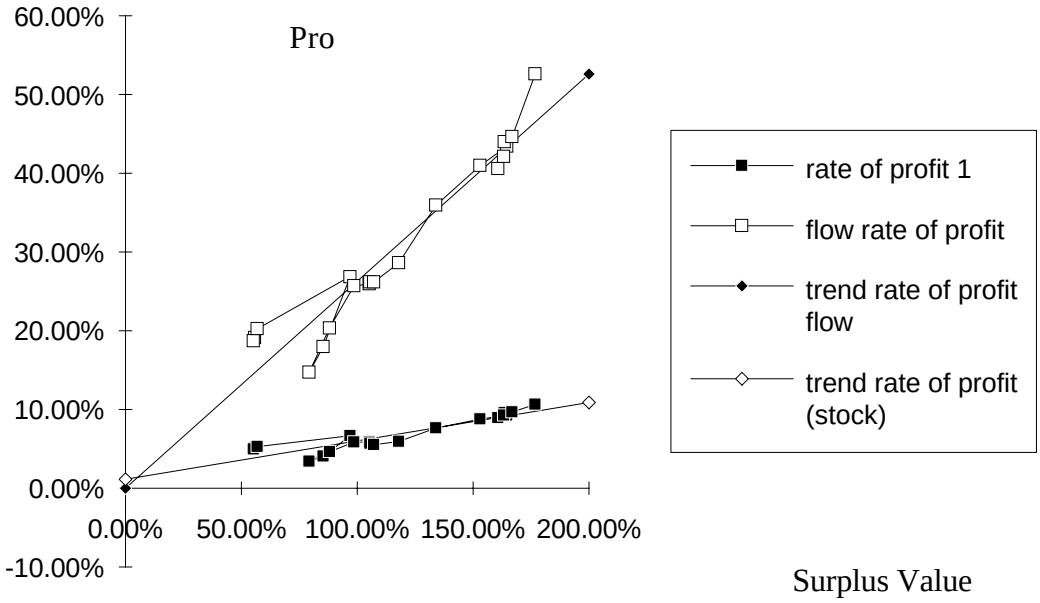

Figure 3. Dependence of profit on surplus value.

A more realistic hypothesis is that the processes of increased exploitation described previously automation, intesification of labour and weakening trades union organisation have produced a growing surplus which has then been divided in a relatively consistent fashion between industrial capital, landed property, the financial institutions and the state. We would argue that surplus value is the prior category, which is later divided between profit, rent and unproductive expenditure. Marxian theory would predict changes in the mass of profit to be strongly correlated with changes in the mass of surplus value. If on the other hand, surplus value is an synthetic category, an artificial aggregate of heterogenous revenues , they would be only weakly correlated.

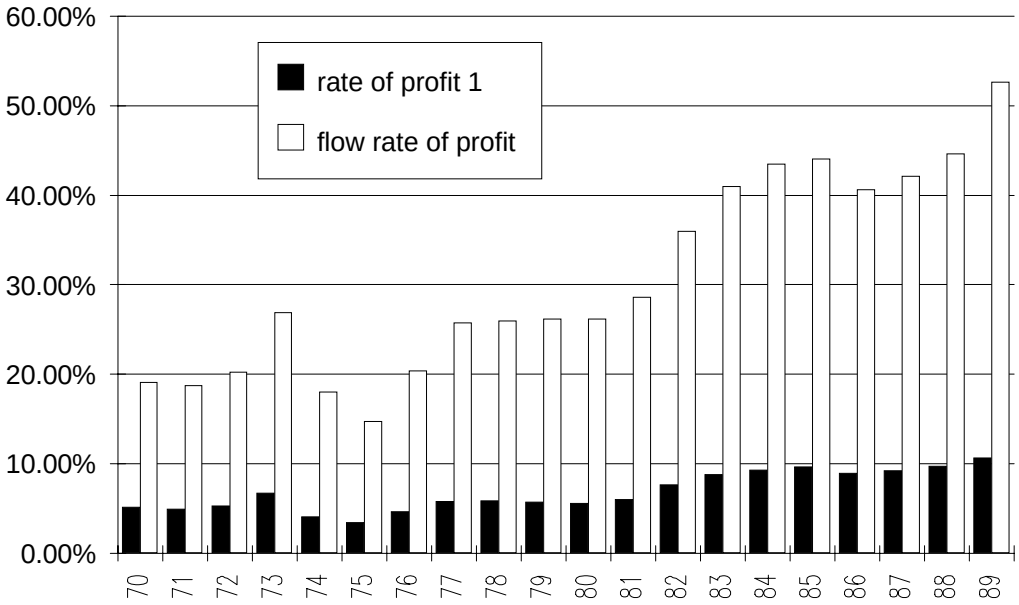

Figure 4. Evolution of the rate of profit 1970 to

The Marxian hypothesis would predict the rate of profit to be an approximately linear function of the rate of surplus value, with intercept at zero. In other words as the rate of surplus value tends to zero so does the rate of profit. The scatter plot of profit against surplus value, (figure 3) reveals that: this is indeed the case. The trend lines for both stock and flow rates of profit pass close to the origi and the datapoints are clustered on the trend lines

The data are consistent with the hypothhesis of Marx, that surplus value is the prior category and the profit, rent, interest etc are derived categories.

The rate of profit

As discussed in the first section, during the 1960s and 1970s, British capitalism experienced severe declines in profitability. It can be seen from figure 4, that this situation was reversed under the Tory government.

The recovery in profitability affected both the flow[17] and the stock rates of profit. The recovery in the rate of profit calculated on a stock basis has been helped by the fact that the organic composition of capital[18] has remained more or less constant since the late '70s. The summary tables 2.1 and 2.2 show the reason for the stability in the organic composition of capital: for most of the 1980s there was no net accumulation of capital. The level of investment failed to cover depreciation. This fact emphasises the primitive methods by which profitability has been increased. It has occured despite the run down in the capital stock, it has come not from investment and modernisation as much as from the intensification of labour.

Historically the organic composition had a tendency to rise during periods of rapid accumulation as the amount of capital equipment used per worker went up. Conversely, during periods of relative stagnation the organic composition falls. The organic composition on a stock basis *k/v* is determined by the integral over time of the relative rates of growth of constant capital and variable capital. The growth of variable capital is more or less equivalent to the growth of the employed proletarian population. The growth of constant capital depends upon the rate at which profits are re-invested in new plant and machinery. When this rate is high, the value of plant and machinery per worker grows. When, conversely, the rate of accumulation out of profit fell, the rate of growth of the constant capital stock could fail to keep up with the growth of the proletarian population.

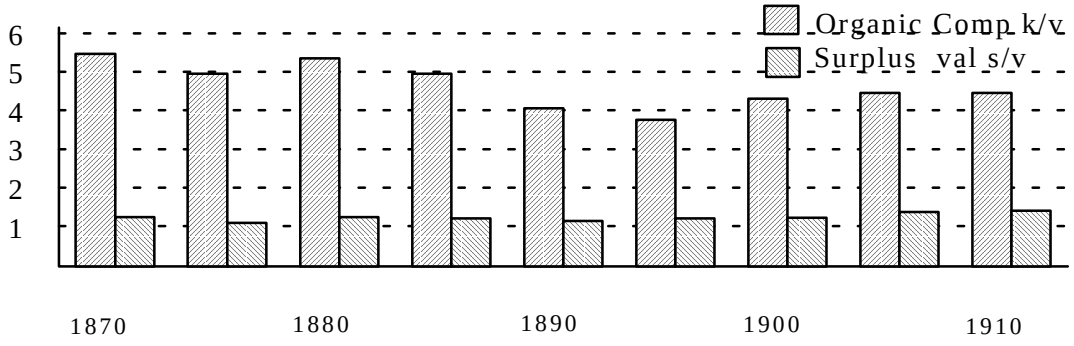

Figure 5 Evolution of organic composition and surplus value

This is particularly clear when viewed over long periods. Figure 6, shows how over roughly a century from the 1870s to the 1960s, how the organic composition has depended upon the rate of accumulation. Overall the picture is a pretty bleak one. With the exception of the period from 1945 to the 1970s, the level of accumulation out of profits was generally low, rarely reaching 20%, and for much of the period being below 10%[19]. Both the recession of the late 19th century and the inter war period actually saw falls in the organic composition. These falls occured during periods in which accumulation, though low, was in most years still positive. This implies that the rate of accumulation was insufficient to keep up with the growth in the workforce. The boom years after the second world war saw rapid accumulation and mounting organic composition.

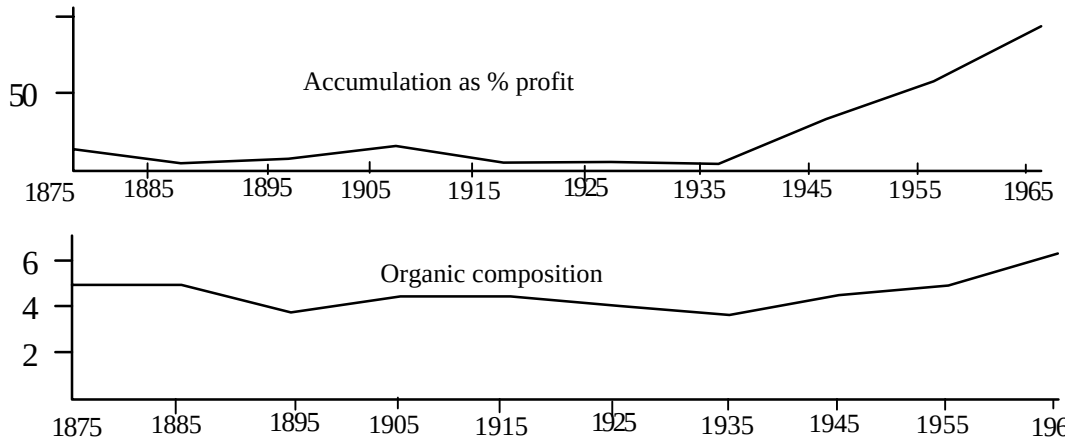

Figure 6 The organic composition is determined by the rate of

Table 2.1 Main ratios 1970 to 1979

year	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
Constant capital £m, k_m	59,200	67,200	77,200	95,200	128,000	155,600	181,400	207,400	239,700	289,600
Variable capital £m, v_m	17,001	18,304	20,542	23,797	28,050	36,239	40,820	45,302	51,955	60,902
Unproductive wages £m, u_m	3,814	4,119	4,650	13,368	15,683	19,016	22,017	25,969	32,798	38,263
rate of surplus value 1, s'_1 %	55.33	55.84	57.97	99.78	88.01	78.75	87.74	99.95	106.70	106.68
organic composition %	348.21	367.13	375.82	400.05	456.33	429.37	444.39	457.82	461.36	475.52
rate of profit , p' %	5.15	4.97	5.30	6.73	4.09	3.39	4.62	5.84	5.85	5.70
flow rate of profit %	18.98	18.91	20.55	27.50	18.43	14.62	20.27	25.99	26.21	26.39
rent /surplus value %	17.77	18.09	17.47	9.97	10.64	10.55	9.84	10.06	10.08	10.37
profit /disposable sv %	70.11	69.70	71.34	77.18	70.83	68.38	74.45	76.41	75.31	74.78
accumulation / sv%	1.74	-1.89	-5.38	-0.23	-2.35	-6.50	-7.82	-9.70	-9.38	-8.11
Unproductive wages/sv %	40.54	40.30	39.05	56.30	63.52	66.64	61.47	57.35	59.16	58.89

Table 2.2 Main ratios 1980 to 1989

year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
Constant capital £m, k_m	337,800	359,900	370,600	382,700	401,000	421,700	442,100	471,200	517,900	573,700
Variable capital £m, v_m	69,504	72,703	75,566	78,090	80,928	87,210	91,612	96,789	104,655	113,614
Unproductive wages £m, u_m	43,267	48,437	54,209	65,039	72,836	78,480	86,076	93,300	103,568	115,839
rate of surplus value 1, s'_1 %	105.46	113.75	130.15	150.56	162.19	163.30	163.73	168.24	174.17	183.95
organic composition %	486.02	495.03	490.43	490.08	495.50	483.55	482.58	486.83	494.86	504.96
rate of profit p' %	5.53	5.93	7.58	8.76	9.24	9.61	8.99	9.30	9.76	10.70
flow rate of profit %	25.82	27.79	35.15	40.41	42.90	43.95	41.17	43.10	46.17	54.39
rent /surplus value %	10.20	10.40	10.48	10.33	10.59	10.56	10.63	10.28	9.85	9.37
profit /disposable sv %	74.97	74.91	76.65	76.88	76.22	76.47	75.05	75.94	77.18	78.98
accumulation / sv%	-12.00	-16.37	-13.86	-12.46	-9.59	-7.77	-8.16	-4.93	0.34	6.42
Unproductive wages/sv %	59.03	58.57	55.12	55.32	55.49	55.11	57.39	57.30	56.82	55.43

Table 3.1, Main ratios from 1870 to 1910 at five year intervals

	1870	1875	1880	1885	1890	1895	1900	1905	1910
Organic Comp k/v	5.50	5.00	5.40	5.00	4.10	3.80	4.34	4.50	4.50
Rate of surplus value s'	1.27	1.12	1.28	1.25	1.17	1.24	1.26	1.40	1.44
Rate of profit p/(v+k)	9.4%	9.0%	8.9%	8.5%	10.4%	10.7%	10.5%	10.9%	11.4%
Accumulation as % of profit	1.8%	14.5%	10.2%	5.4%	5.6%	8.2%	21.2%	16.5%	5.5%

Table 3.2, Main ratios from 1924 to 1973

Year	Organic Comp k/v	% Rate of profit p'=100p/(v+k)	Rate of surplus value s'	Accumulation as % of profit
1924	4.2	7.1%	1.13	4.5%
1925	4.1	9.5%	1.27	6.0%
1926	4.1	7.6%	1.15	1.0%
1927	3.8	8.8%	1.24	3.1%
1928	3.9	9.5%	1.33	6.4%
1929	3.9	9.4%	1.36	4.9%
1930	4.1	9.3%	1.45	0.6%
1931	4.3	5.5%	1.33	4.8%
1932	4.2	5.3%	1.35	-5.4%
1933	4.0	5.3%	1.33	-10.3%
1934	3.8	6.3%	1.34	1.6%
1935	3.7	7.0%	1.34	4.9%
1936	3.7	7.2%	1.33	11.1%
1937	3.8	7.9%	1.37	12.4%
1938	3.9	9.3%	1.50	11.0%
1948	4.57	3.8%	1.50	34.0%
1949	4,53	4,47	1.58	43.0%
1950	4.58	3.6%	1.56	68.0%
1951	4.75	2.3%	1.48	100.0%
1952	4.98	5.6%	1.74	36.0%
1953	4.91	4.7%	1.65	45.0%
1954	4.96	5.0%	1.78	47.0%
1955	4.99	4.6%	1.76	59.0%
1956	5.15	4.0%	1.74	72.0%
1957	5.44	3.8%	1.77	62.0%
1958	5.68	3.7%	1.88	83.0%
1959	5.66	4.1%	1.97	78.0%
1960	5.59	4.7%	2.03	72.0%
1961	5.73	3.9%	1.98	94.0%
1962	5.98	3.6%	2.03	94.0%
1963	6.26	4.0%	2.17	79.0%
1964	6.37	4.2%	2.23	89.0%
1965	6.37	3.9%	2.15	95.0%
1966	6.57	2.5%	2.10	141.0%
1967	7.02	2.9%	2.24	127.0%
1968	7.39	2.8%	2.33	129.0%
1969	7.72	2.1%	2.30	163.0%
1970	7.85	1.3%	2.22	262.0%
1971	8.03	1.2%	2.25	246.0%
1972	8.35	1.1%	2.22	197.0%
1973	9.30	0.5%	1.98	485.0%

METHOD OF CALCULATION, DATA FROM 1970 TO 1989

The data was obtained from the CSO in the form of computer disks to speed processing. Both on the computer disks, and in the Blue Book, each time series has a 4 letter code in addition to a longer description of its content. In what follows, the 4 letter codes, written thus: GIIU, GIIP, etc, stand for the corresponding time series in the Blue Book. These provided the primary time series.

The Blue Book data is obviously not presented directly in the terms we would wish. It is necessary to perform aggregations to obtain totals for *v, c, s* etc. From the primary time series, new aggregate series were constructed that are broadly in line with the conceptual categories presented in Capital.

variable capital £m

We define v_m to be the sum of wages and salaries in productive sectors. Using the categories in the Blue Book this means:

v_m =

GIIB :- GDP: agriculture, forestry & fishing : income from employment £m
+ GIIF :- GDP: energy & water supply: income from employment £m
+ GIIK :- GDP: manuf (revised def): income from employment £m
+ GIIP :- GDP: construction: income from employment £m
+ CCIU :- GDP: transport and communication: Income from employment

This excludes income from employment in :

1. banking, finance, insurance.
2. distribution, hotels and catering.
3. Public administration and national defence.
4. Education and health services.

This is not exactly what we want to compute. Labour expended in hotels and catering is productive, but given the aggregation used in the Blue Book, it can not be distinguished from distribution and retailing, which is not. This tends to make our figures for v_m underestimates. Against this, the figures for income from employment in the industries we do count will include the salaries of those employed within these sectors on unproductive activities like sales, accountancy etc. Without further information, it is hard to estimate how big the error terms introduced by this are.

constant capital stock £m

This represents the outstanding stock of means of production that operate as capital owned either by private companies or as state capital owned by public corporations. Note that this will include the capital employed unproductively. This has to be included, since each capital, whatever its field of application claims its own alliquot part of the aggregate surplus value in the formation of an average rate of profit.

k_m=

(EXHK :- I&C companies: net capital stock: all fixed assets £bn
+ EXHM :- Public corps: net capital stock: all fixed assets £bn
- EXGW :- I&C companies: net capital stock: dwellings £bn

- EXGY :- Public corps: net capital stock: dwellings £bn) mult 1000.0

gross profit

This is the total profit before allowing for depreciation or stock appreciation, of all productive capitalist enterprises. Here we obviously do not discriminate between different sectors of application of the social capital to which the profit accrues.

p_{gm}=
GIIC :- GDP:agriculture,forestry,fishing:income from self-employment,other trading £m
+GIIG :- GDP: energy & water supply: income from self-employment & company profits £m
+GIIH :- GDP : energy & water supply : gross trading surplus of public enterprises £m
+GIIL :- GDP: manuf (revised def): income from self-employment & company profits £m
+GIIM :- GDP: manuf (revised def): gross trading surplus of public enterprises £m
+GIIQ :- GDP : construction : income from self employment & company profits £m
+GIYU :- Transport + comms. gross profits of coys. + income from self employ
+GIYV :- Trans. + comms. gross trdg. spls. of public enterprises
+GIJH :- GDP: banking & finance: gross trading profits & other trading income #m
+GIJI :- GDP : banking & finance : adjustment for financial services #m

unproductive wages

This represents the value of the labour power that is exchanged against revenue rather than against capital. Following Gillman we denote it by *u*.

u_m=
GIIT :- GDP: distribution: income from employment £m
+GIJG :- GDP: banking & finance : income from employment £m
+GIJK :- GDP: public administration: income from employment £m
+GIJO :- GDP: education & health: income from employment £m

appreciation

This represents the apparent increase in the value of stocks of goods and machinery that is purely due to inflation. This tends to artificially inflate profit figures during inflationary periods.

a_m=
GIIE :- GDP:agriculture,forestry & fishing: stock appreciation £m
+GIIJ :- GDP: energy & water supply: stock appreciation £m
+GIIO :- GDP: manuf (revised def): stock appreciation £m
+GIIS :- GDP: construction: stock appreciation £m
+DHNM :- Stock appreciation for transport communication

depreciation

This represents the decline in the value of the capital stock due to wear and tear. It strictly it represents only a part of *c*, the flow measure of constant capital, only part since the flow of raw materials, a part of *c* , is excluded from depreciation.

c_m=
EXEX :- Capital consumption : agriculture, forestry & fishing £m
+EXCK :- Capital consumption : all other energy & water supply £m
+EXCK :- Capital consumption : all other energy & water supply £m

+EXCL :- Capital consumption : manufacturing (revised defn) £m
+EXCM :- Capital consumption : construction £m
+EXCP :- Capital consumption : transport £m
+EXCQ :- Capital consumption : communication £m

Tertiary data

From the aggregate time series, the ratios of interest were obtained by the following equations

(1) $p_m = p_{gm}+a_m-c_m$

(2) $\boldsymbol{s_{dm}}$ ***=disposable surplus value*** $=p_m+r_m$ *= net profits + rent*

(3) $s_m=s_{dm}+u_m$

(4) s'_1 = ***rate of surplus value 1*** $= s_m/v_m$

(5) $K_m=k_m+v_m$ = ***total capital***

(6) $p' = p_m/K_m$

(7) $p'_f= p_m/(c_m+v_m)$

(8) r_m/s_m = ***rent.as.share.of.sv***

(9) p_m/s_{dm} = ***profit.as.share.of.dsv***

(10) $\boldsymbol{(acc- c_m) /s_m}$ *= (accumulation - depreciation) / surplus.value*

(11) $o'=k_m/v_m$=***organic.composition***

There is a further implicit assumption that the turnover time of variable capital is one year. This is of no significance in computing the rate of surplus value but it does affect measures of the organic composition.

[1] The Falling Rate of Profit, J Gillman, Oxford University Press, 1957.

[2] The declining rate of profit, Panic and Close, Lloyds Bank Review, 112.

[3] British Capitalism Workers and the Profits Squeeze, A Glyn, R Sutcliffe, Penguin, 1972.

[4] Theories of Surplus Value, K Marx, Lawrence and Wishart, 1969, Vol. I, pp387-413; Capital, K Marx, Lawrence and Wishart, 1970, Vol. I, pp 1042-1049.

[5] Inflation, the crisis and the post-war boom, P Bullock, D Yaffe, *Revolutionary Communist*, 3/4,1975, pp. 5-45.

[6] Britain's Economic Problem, R Bacon, W Eltis, Macmillan, 1976

[7] Capital, Vol. I, p 219.

[8] Capital, Vol. I, p 220.

[9] Positive profits with Negative Surplus Value, I. Steedman, *Economic Journal*, Vol 85, pp. 114-123.

[10] Negative Surplus Value and Inferior Processes, E Hosada, *Metroeconomica*, 44(1), February 1993, pp. 29-42.

[11] Production of Commodities by Means of Commodities, P Sraffa, Cambridge University Press, 1960.

[12] Positive Profits with Negative Surplus Value: A Comment, E Wolfstetter, *Economic Journal*, 86, December, pp. 864-872.

[13] Production of Commodities by Means of What?, E Farjoun, in A Freeman and E Mandel (eds) *Ricardo, Marx, Sraffa* (London:Verso), 1984, pp.11-41.

[14] The transformation from Marx to Sraffa, A Shaik, in A Freeman and E Mandel (eds) *Ricardo, Marx, Sraffa* (London:Verso), 1984, pp. 43-84.

[15] Input-output tables for the United Kingdom 1984, Central Statistical Office, HMSO, 1988.

[16] Capital, K Marx, Lawrence and Wishart, 1971, Vol. III, Chap IX.

[17] For definitions see the subsection on method of calculation.

[18] This is ratio of capital stock to the wage bill in a given period.

[19] Given that the ideological justification given for profit is the need to fund new investment, the gap between ideology and reality is striking.