

# The rate of profit in the UK, 1920–1938

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The UK rate of profit rose considerably over the inter-war period and hence this period was one of significant recovery for capital, albeit with some volatility. Several decompositions of the profit rate are explored in pursuit of proximate determinants of the rising profit rate. A Marxian decomposition shows that the 1920s were characterised by a rising rate of surplus-value and a falling composition of capital; and the 1930s by a constant rate of surplus-value and a falling composition of capital. A decomposition into the product of profit share and capital productivity shows that the profit share in the first half of the 1920s was driven upwards by the excess of productivity growth over real wage rate growth, but thereafter fluctuated inversely with fluctuations in the unproductive wage share; the predominant positive impact on the profit rate was rising capital productivity. This was due to rising labour productivity with constant capital intensity in the 1920s, and rising labour productivity with falling capital intensity in the 1930s. Some implications for both Marxian theory and historical interpretation are considered.

*Key words:* Rate of profit, UK interwar years, Marxian models  
*JEL classifications:* B51, E11, N14, O52

## 1. Introduction

The interwar years are widely characterised as a period of stagnation for the UK economy (Aldcroft, 1967, 1970; Richardson, 1967), or at best only moderate recovery from the economic shocks of the First World War and its aftermath, since it was not until the latter part of the period that growth in output was comparable to the UK's long run average (Lomax, 1964; Dowie, 1968). Whatever the emphasis, this view notes the comparatively low level of output growth in this period and its major concern is with identifying underlying problems that prevented output recovering more quickly and fully. Behind this perspective is an understanding of the economy as essentially a social mechanism that facilitates individual welfare maximisation, and thereby the primary concern is with the development of the ability of the economy to satisfy consumer welfare through the expansion of individual consumption. The role played by profit is largely ignored.

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Focusing on the ability of the economy to generate profit, however, changes matters. The interwar period saw a considerable increase in the profit rate from a historically low level to one approaching pre-1914 levels, suggesting that this was a period of significant recovery for capital. The UK rate of profit saw a marked rise of 70.6% over the interwar years increasing from 10.6% in 1920 to 18.1% by 1938, an average annual rate of increase of 3.0%. This represents a significant recovery in the rate of profit towards pre-war levels after a sharp decline over the war years. Matthews *et al.* (1982) provide estimates of the net profit rate for the domestic non-farm trading sector for benchmark years between 1856 and 1973, finding a decline in the profit rate from 14.9% in 1913 to 11.2% in 1924, but recovering to 14.2% in 1937. This would appear to be a period of recovery between the fall in the last quarter of the nineteenth century and the fall during the ‘golden age’ following World War II. For pre-war benchmark figures for 1856, 1873 and 1913, the net profit rates are 15.6%, 17.3% and 14.9%, respectively, whilst figures for the period following World War II show much lower rates of profit at 9.3%, 10.3%, 8.7% and 4.6% for the years 1951, 1953, 1964 and 1973, respectively. Hence the immediate concern is not with identifying barriers to recovery in output, but with accounting for the strong rise in the rate of profit in the inter-war period. Questions such as why output remained comparatively low and did not grow more strongly may then be investigated in the light of an understanding of the changing conditions of profitability over the period.

This is not to say that changes in the level of output or employment follow movements in the rate of profit in some direct or simple manner, but that an investigation of the trajectory of the profit rate provides the logical starting point for an empirical investigation of an economy whose expansionary motor is profits and profitability. There have been a number of such studies over the last 25 years or so, but typically these studies have focused on the US economy after 1945, the major exception being Duménil and Lévy (1993) who examine longer run changes in the US rate of profit. But there is little agreement in how these sorts of studies should be carried out, and much controversy on how the data should be treated.

Marxian empirical analysis appears to be absent from the debate over the re-evaluation of the UK interwar economic data, which followed the publications of Lomax (1959) and Matthews (1964). It is true that the UK data are much more limited than that for the USA, and this does require that empirical results for the UK must be treated with considerable caution. Yet only Cockshott *et al.* (1995, 1996) have examined the UK interwar period in detail. They explain the recovery in the rate of profit by a rising rate of surplus-value coupled with a falling composition of capital, with this latter movement explained by the effect that comparatively slow growth in output had on capital accumulation. By contrast, this paper follows a different approach to the decomposition of the profit rate in order to connect better with the two fundamental relations underlying profitability in a class-divided society—that between productivity growth and real wage rate growth, and that between productivity growth and capital deepening. To justify this requires that issues of methodology be considered before the data can be presented.

The paper is organised as follows. The next section establishes the conceptual framework for Marxian empirical work, discusses some of the difficulties in establishing empirical referents for the theoretical categories, and outlines the particular assumptions and compromises made in using the data for the period 1920–1938. Section 3 outlines two rates of profit—a conventional macroeconomic rate of profit and a Marxian rate of profit—and the relationship between them. It considers the Marxian ratio of the rate of surplus-value to the value composition of capital, provides empirical measures, and

contrasts these measures with those of Cockshott *et al.* (1995). Section 4 considers the decomposition of the macroeconomic rate of profit into the product of profit share and capital productivity, interprets these in terms of the theoretical categories of Section 2 and provides empirical estimates of these. The following section sketches an interpretation of the two interwar decades in terms of the measures developed and makes suggestions for further research.

## 2. Marxian empirical work

Measurement of empirical categories from a Marxian theoretical perspective has always been a vexed issue partly because of the distance between abstract Marxian theory and concrete empirical data, and partly because the data are themselves constructed from a different theoretical perspective. It is therefore necessary to say something about each of these issues, for positions on both of them underpin the subsequent empirical analysis.

### 2.1 *Abstract Marxian theory and concrete empirical data*

The relationship between labour values and prices is part of the content of the ‘transformation problem’, and so any empirical investigation must presume some theoretical position on the relation between labour values and prices. This paper rests on the interpretation first put forward in English by Foley (1982, 1986) and elaborated by Mohun (1994).<sup>1</sup>

Briefly, this interpretation holds that labour-time in production is the source of all value, and that a unit of money is how society measures value when it is separated from the commodity in exchange. In this sense, money represents social labour-time. Then, in the aggregate, value added in terms of hours (of socially necessary labour-time) and value added in terms of money (a measure of net national product) are different measures of the same value substance. So they can be equated via the value of money (or its inverse, the monetary expression of labour-time). Hence in the aggregate, total wages and total profits are together equivalent to total variable capital (number of workers multiplied by the value of labour-power) and total surplus-value. In general, this is a relation that only holds for aggregate value added, because of the unequal exchanges characterising individual commodities produced with differing compositions of capital.

But this equivalence relation between labour value and money value also holds for the individual commodity labour-power. Clearly, when the wage purchases consumption commodities, each such commodity is typically produced with a different composition of capital, so that unequal exchanges of value are the norm. But when labour-power is sold for a wage this is not true, because labour-power is not a produced commodity, and it is meaningless to talk of any composition of capital in its production. Of course, under the assumption of equal exchange (the *Capital* Vol. 1 world), the value of labour-power, the money wage and the bundle of commodities purchased by the wage are all equivalent. But as soon as unequal exchange is presumed (the *Capital* Vol. 3 world), the value of labour-power cannot be measured by the value of the wage bundle of commodities, and can only be measured by the wage.<sup>2</sup>

<sup>1</sup> See also Duménil (1983–4).

<sup>2</sup> Another way of making the point is through recognising that labour-power has no relative form of value, only an equivalent form.

Since, in the aggregate, value added in money terms is equal to value added in labour hours divided by the value of money, then, provided aggregate labour hours can be interpreted as the quantitative measure of total social (abstract) labour, the value of money is determined. And since the value of labour-power per hour of labour hired is equal to the hourly wage rate divided by the value of money, the value of labour-power is determined (as the wage share of net product). It then immediately follows that total wages are equal to total variable capital divided by the value of money, and total profits are equal to total surplus-value divided by the value of money. That is, given the value of money, total profits exactly measure total unpaid labour and are the monetary form of total surplus-value. Finally, the profit-wage ratio is the rate of surplus-value.

Given this, the traditional concerns of the 'transformation problem' are not relevant to this interpretation of the relation between value and price. In particular, there is neither need for, nor point in, any separate accounting system in terms of embodied labour coefficients. Because the interpretation is one of aggregates, and because of unequal exchange at the level of individual commodities produced by different compositions of capital, it is in general not possible to relate individual labour values to individual prices in any simple monotonic relation.<sup>3</sup> In place of traditional concerns is an interpretation of the labour theory of value as a theory of the production of total value added and its distribution between classes. The value of money allows translation between total value added in hours and in money, between total variable capital in hours and total wages in money, and between total surplus-value in hours and total profits in money. Hence this is an operationalisable accounting system in terms of money and is sufficient to measure Marxian value aggregates whatever the rate of profit is and whatever prices happen to be.

## 2.2 Empirical issues with the data

Measuring net value added in terms of money requires subtracting depreciation from gross domestic product (GDP) to determine net national product (NNP). But product aggregates of this type are developed within a particular (broadly Keynesian) framework and from a Marxian perspective are hybrid monetised measures of use-values and values. So further subtractions are required, of a variety of imputations (the major item being the rent imputed to owner-occupiers) and of the wages paid to those who produce outputs that are not marketed as commodities (the major item being the compensation paid to General Government employees).

Interpreting total labour hours as socially necessary labour-time might imply the necessity for some correction for different levels of work intensity and different levels of skill. The position taken here is that when Marx introduced the concept of socially necessary labour-time, he did so in the course of a discussion of the typical commodity. Writing prior to the development of the statistical techniques underlying contemporary national accounting methodologies, Marx considered that the total labour-power of society counted 'as one homogeneous mass of labour-power . . . composed of *innumerable* individual units of labour-power' [our emphasis], each unit being 'the same as any other' having 'the character of a socially average unit of labour-power' (Marx, 1976, p. 129). But once the survey techniques are developed for counting these units, multiplying this average by the number of individual units can only yield the total number of hours worked or the total labour-power of society. Differences in intensity might matter at the level of the

<sup>3</sup> See Mohun (2004) for some results.

individual commodity, but this is where value theory has no purchase. Differences in skill can be accounted for in a macroeconomic approach by weighting quantities of labour by the appropriate wage rate, so that skilled labours are quantitative multiples of unskilled labour, ‘established by a social process that goes on behind the backs of the producers’ (Marx, 1976, p. 135).

The major difficulty does not concern differences in intensity or skill. It is that not all labour employed by capital is productive of value and surplus-value. In its process of valorisation, capital passes through a number of forms. From its money form, the activity of purchase converts it into inputs (productive capital), which are then transformed into outputs (of greater value) via labouring activity. Capital then exists in the form of commodities awaiting sale (commodity capital), and after sale it exists as money capital once more. In such a circuit, the activities of sale and purchase do not create value; they merely change the form in which capital exists. The labouring activities involved in the processes of mobilising money for investment in production (organised by financial capital), and converting outputs into money (organised by commercial capital) are therefore unproductive of value and surplus value.<sup>4</sup> Consequently, the profits from such activities must necessarily derive from a transfer of surplus-value from productive capital, which can only occur through unequal or non-equivalent exchange.<sup>5</sup>

There is a further stratum of labour that is unproductive under capitalist relations, which is the labour of supervision and control. Conceptually, it is possible to distinguish such labour from the labour of organisation and planning, for the latter can be conceived in democratic non-capitalist forms, whereas the labour of supervision and control is hierarchical and fundamentally authoritarian.

All of this entails some serious difficulties with the use of National Accounts wages and salary data, because such data measure the compensation paid to *all* employees. While an industrial classification of employment can identify employment in commerce and finance (wholesale and retail trade, finance, insurance and real estate, and legal and business services), it cannot identify hierarchical levels of employment.<sup>6</sup> Inevitably, empirical analysis of aggregate value relations has to make do with approximations, with no reliable way of evaluating how good these might be.

### 2.3 Assumptions underlying the analysis of the inter-war UK data

The main source of UK aggregate economic data for the UK inter-war period is the series of Cambridge studies in national income and expenditure, and the data employed here come from three publications in this series, Chapman (1953), Feinstein (1965) and Feinstein (1972). Money value added is a measure of new value added and differs from NNP (GDP net of capital consumption) in that the latter includes both notional incomes (primarily the imputed rent that owner-occupiers are deemed to pay to themselves) and

<sup>4</sup> The terminology is traditional but unfortunate, because such unproductive activities are essential to the circuit of capital. Because there is no single systematic treatment of productive and unproductive labour in Marx’s own writings, there is room for considerable controversy in constructing such a treatment, and there is a very large literature on these issues. We do not justify our underlying theoretical position here. The focus on the circuit of capital to organize an understanding of productive and unproductive labour can be found in Foley (1986) and Mohun (2003). A dissenting view, which also bears on Section 3 below, is Laibman (1993).

<sup>5</sup> The labour employed by financial and commercial capital remains exploited in the sense that it is paid for a fraction of the working day but, unlike productive labour, its surplus labour is not monetised.

<sup>6</sup> Neither can occupational surveys, because typically (and unsurprisingly) the wrong (survey) questions are asked.

incomes associated with non-market activity (the income of national and local government employees, and the income from the non-marketed labour of domestic servants). Money value added is thus determined by subtracting from NNP imputed rent,<sup>7</sup> national and local government expenditure on wages and salaries, and private expenditure on the employment of domestic servants.<sup>8</sup> Total income from employment is calculated as the pre-tax sum of wages and salaries and employer contributions to pensions (except for the categories of General Government employees and employees in domestic service). Profit is simply money value added minus total income from employment.<sup>9</sup> These figures are taken from Feinstein (1972).

The income of the self employed is conventionally *sui generis*, neither compensation of employees nor profits. Such income could be interpreted as consisting of an element paid as wages, and, for any income over and above the norm for the kind of work undertaken, an element paid as profit. Ideally these two elements should be separated. But while the aggregate national income figures do provide an estimate of income from self employment, no estimate is available at industry level, and the income of the self employed or 'working proprietors' is included with operating surpluses. Figures for 'Labour' income from self employment are available in five year blocks from 1910 to 1963 (Feinstein, 1968, p. 125, table 4). These figures are estimated from census data of numbers of self employed persons by industrial sector, multiplied by the average yearly wage of paid employees in each sector, summed across sectors to yield an economy wide 'Labour' income from self employment and a residual income from 'Property' (Feinstein, 1968, pp. 124–5). These industrial sector estimates produced by Feinstein and Hart in the mid-1960s were not published at the time (Feinstein, 1968, p. 137) and, as far as we are aware, they have not been published or reproduced since. This is unfortunate because not accounting for a wage equivalent income from self-employment will underestimate the aggregate wage share in total income and will bias the trend of the wage share except in the event that the ratio of the number of employed to self-employed persons remains constant in each industrial sector over the period considered. If the self-employed were distributed across industries in the same proportions as employees, then it would be possible to divide their income by using the weighted average income from employment of employees by industry to estimate a self-employed wage component and hence to determine a profit component as a residual. It is highly unlikely however, that either the proportion of self employed persons in the total workforce remains constant, or that distributional changes in self employment mirror exactly those of employed persons.<sup>10</sup> Future studies may wish to reproduce Feinstein and

<sup>7</sup> Feinstein includes under industry operating surpluses an imputed rent to private and public enterprises owning their own land and buildings, and this should similarly be excluded from money value added. However, this figure is not separately identifiable and for simplicity no attempt to estimate it is made.

<sup>8</sup> Assuming the expenditure on domestic labour employed and hired out by commercial agencies is negligible.

<sup>9</sup> Wages 'not allocated by industry' is also subtracted from total income and from NNP. This is a catch-all category for undeclared/unrecorded income, and Feinstein simply calculates this as 2% of recorded wages. Its inclusion makes a small difference to the level of wages but none to the trend. Two other corrections are made to make the income from employment figures consistent with the money value added calculation. First, the income of domestic servants is subtracted from miscellaneous services. Second, the income of professionals employed by local government is subtracted from professional services.

<sup>10</sup> Indeed, the share of income from self employment certainly changes over the interwar period, rising from 15% of total income in 1920 to 17% in 1922, remaining around that figure until 1926, then falling to 13% by 1937 (Feinstein, 1972). The proportion of 'labour' income in self employment income increases from 51.9% in 1921–1924 to 63.1% in 1935–1938 (Feinstein, 1968). Because the self-employed tend to be clustered in agriculture, construction, retail trade and a variety of services, the lack of industry data is a significant problem.

Hart's sector wide figures in order to avoid this bias.<sup>11</sup> Working in the other direction, directors' fees and certain high salaries could be considered, at least in part, a share in profits rather than labour income, but they are included in wages and salaries. No attempt to estimate these amounts has been made here and the figures are left unamended. This, too, is obviously unsatisfactory.

The 'Income from employment by industry' figures (Feinstein, 1972, table 22) provide the basis for the productive/unproductive labour split employed in this paper. Productive workers are proxied by waged workers in productive industries, whilst unproductive workers are taken to be salaried workers in productive industries along with all workers in unproductive industries.<sup>12</sup> Productive industries are taken to comprise: Agriculture; Mining and Quarrying; Manufacturing; Building and Contracting (minus local government); Gas, Electricity and Water; Transport and Communication; Miscellaneous Services (entertainment and sports, catering and hotels, and laundries, job dyeing and dry cleaning). Unproductive industries are taken to comprise: Distributive Trades; Insurance, Banking and Finance; Professional Services (minus local government professional); Miscellaneous Services (the residue after deducting productive miscellaneous services and domestic labour).<sup>13</sup>

There is necessarily an element of arbitrariness in this division. Within the productive industries some labour is unproductive, in particular, managerial/supervisory and associated administrative labour to the extent that this enforces exploitation, and that labour involved in accounting/financial planning, purchasing/sales etcetera. 'Salaried staff' is used as a proxy for this labour as it includes all administrative, technical and clerical workers, managers and superintendents. This proxy is clearly imperfect. Some productive workers are included, such as research staff, whilst a number of unproductive workers, such as workshop supervisors/foreman, are recorded as waged staff. The 'salaried employees' category, however, provides the most adequate available proxy for unproductive labour employed within productive industries. But while some effort has been made to render the productive/unproductive industries split consistent, anomalies will doubtless remain.

Feinstein provides a 'best guess' guide to the quality of the aggregate data, judging that income from employment data are 'firm', that is within plus or minus 5% of the true figure, and data for gross trading profit of companies are 'good', that is within 5%–15% of the true figure (Feinstein, 1972, p. vii). He does not provide similar evaluations of the industry level figures, because these data are based on Chapman's earlier estimates. Chapman judges only Manufacturing data to be 'firm'.<sup>14</sup> Mining and Quarrying is judged 'good to firm'.<sup>15</sup> Building and Contracting, and Gas, Electricity and Water are judged 'rough to good'.<sup>16</sup> Other estimates are judged 'rough, or are just conjectures (Chapman, 1953, pp. 232–33). Clearly, the disaggregated data must be treated with caution.

<sup>11</sup> Glyn (2009), Gollin (2002), Kuznets (1959) and Kravis (1959) discuss various methods of estimating the wage income from self employment. Gollin (2002) provides a broad overview of the issues. Kuznets (1959, pp. 26–7) discusses the relative merits of estimating a wage income directly or as a residual after first estimating a property income. Kravis (1959, p. 926) and Glyn (2009, p. 109) emphasise the importance of employing sector rather than industry wide average wage rates.

<sup>12</sup> Feinstein does not split employer contributions to pensions by wage and salary, and so a simple proportionate allocation is made to the figures.

<sup>13</sup> Directors' fees not allocated by industry are added to the unproductive salary bill and treated as part of unproductive industry.

<sup>14</sup> That is, a 95% probability of being within 5% of the true figure.

<sup>15</sup> A 95% probability of being within 10% of the true figure.

<sup>16</sup> 'Rough' being a 95% probability of being within 25% of the true figure.

Data for the number of workers employed are taken from Chapman (1953). Chapman provides figures for numbers of waged and salaried workers employed, measured in 'man-years',<sup>17</sup> split over the same industrial classification as Feinstein (1972).<sup>18</sup> Chapman provides a comment on the reliability of the data, judging estimates of numbers employed 'firm' or 'good' for most sectors.<sup>19</sup>

The rate of profit is calculated as a flow to stock ratio, that is, the ratio of profit to the stock of fixed capital and inventories. Capital stock data are taken from Feinstein (1965). The data are split broadly over the same industrial classification as Feinstein (1972), and productive industries are taken to comprise: Agriculture; Fishing; Coal Mining; Other Mining; Utilities; Manufacturing; Distribution and Other Services (hotels, inns and restaurants, and entertainment and sports). The unproductive industries are taken to consist of Distribution and Other Services (including financial and professional services but net of hotels, inns and restaurants, and entertainment and sports). Constant capital is estimated by the sum of depreciated fixed capital<sup>20</sup> at current replacement prices plus total stock-in-trade and work in progress<sup>21</sup> at current prices. Feinstein (1965) also gives constant price data for each category and these data are employed in calculating real capital intensity.

The capital stock data presented in Feinstein are the most comprehensive available but the reliability of the data is hard to gauge.<sup>22</sup> Feinstein does however give a 'subjective' impression of the reliability of the estimates: Electricity Supply, Railways, Road Transport, Post Office and Local Authority data are considered 'good', that is, with a probable margin of error of plus or minus 7%. Gas, Hospitals, Manufacturing and Retail data are considered 'fair', that is with a probable margin of error of 7%–15% (Feinstein, 1965, pp. 236–7). Other estimates are considered poor or just rough estimates. Again, the disaggregated figures must therefore be treated with some caution.

### 3. Conventional and Marxian rates of profit

#### 3.1 *A Marxian style decomposition*

The macroeconomic rate of profit ( $r$ ) is conventionally defined as the ratio of total profit ( $\Pi$ ) to total capital invested ( $K$ ). Profit is here interpreted as all money value added ( $Y$ ) that is not wages ( $W$ ), and total capital invested is the stock of fixed capital. Since wages comprise the wages paid to productive workers ( $W_p$ ) and those paid to unproductive workers ( $W_u$ ), and the capital stock comprises that part that is worked by productive labour ( $K_p$ ) and that by unproductive labour ( $K_u$ ), then

$$r = \frac{\Pi}{K} = \frac{Y - W_p - W_u}{K_p + K_u} \quad (1)$$

<sup>17</sup> Part-time working is taken as a fraction of the normal number of hours worked for the industry under consideration, and temporary absence, e.g. sick leave, holidays, is counted towards employed time, but not time lost due to industrial disputes.

<sup>18</sup> Because Feinstein's income from employment figures are based on Chapman's estimates, data drawn from the two works are readily compatible.

<sup>19</sup> Chapman (1953, pp. 230–36) provides a full discussion of the issue.

<sup>20</sup> Excluding land for agriculture.

<sup>21</sup> For Agriculture, livestock and poultry and crops at end of year, not including standing stock of timber.

<sup>22</sup> Feinstein (1965, p. 236) notes that there 'is no objective means of assessing the margin of error in the estimates presented'.



Since productive workers produce all money value added, the difference between money value added and the wages paid to productive workers defines money surplus-value (*MSV*), so that

$$r = \frac{MSV - W_u}{K_p + K_u} \tag{2}$$

After some manipulation, this can be written as

$$r = \frac{K_p}{K} \left[ \frac{\frac{MSV}{W_p} - \frac{W_u}{W_p}}{\frac{K_p}{W_p}} \right]$$

In terms of classical Marxian categories, the first term in the numerator of the square brackets is the rate of surplus-value (*e*), and the denominator is a proxy for the value composition of capital (*VCC*). Then

$$r = \frac{K_p}{K} \left[ r_m - \frac{\frac{W_u}{W_p}}{VCC} \right] \tag{3}$$

where *r<sub>m</sub>* denotes the ‘Marxian rate of profit’:

$$r_m = \frac{MSV}{K_p} = \frac{\frac{MSV}{W_p}}{\frac{K_p}{W_p}} = \frac{e}{VCC} \tag{4}$$

The Marxian rate of profit has no empirical significance other than to highlight the importance of unproductive labour and unproductive capital. It indicates the macroeconomic profitability of the economy, were the labour and capital of circulation (commerce and finance) and supervision to be entirely costless. This is not the same as presuming that all labour and all capital is productive (that is, that the productive–unproductive distinction should be abandoned), because such a presumption destroys any analytical significance to the distinction between production and circulation.

Note also the rate of surplus-value can be considered in the following manner. Since any money magnitude is a product of a price index and the corresponding real magnitude (prefixed by *R*), and any wage total is the product of the appropriate hourly wage rate (*w*) and the number of hours worked (*H*), then

$$e = \frac{MSV}{W_p} = \frac{Y - W_p}{W_p} = \frac{P_Y RY - w_p H_p}{w_p H_p}$$

so that

$$e = \frac{\frac{RY}{H_p} - \frac{w_p}{P_Y}}{\frac{w_p}{P_Y}} \tag{5}$$

Defining labour productivity as constant price money value added per hour (or loosely, real output per hour), then the rate of surplus-value rises (falls) if the rise in labour productivity (real output per hour) is greater (less) than the rise in the real wage rate.

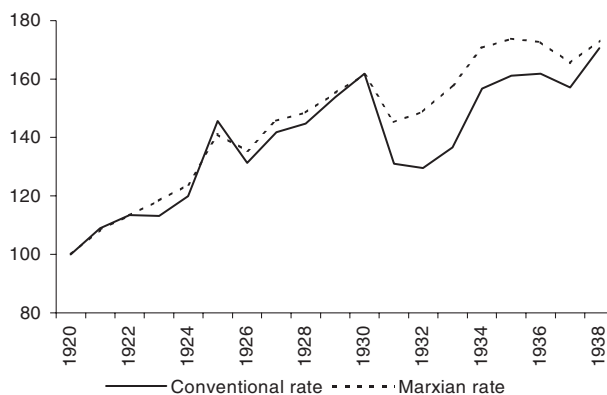


Fig. 1. Conventional and Marxian rates of profit, UK, 1920–38 (1920 = 100)

### 3.2 Empirical results

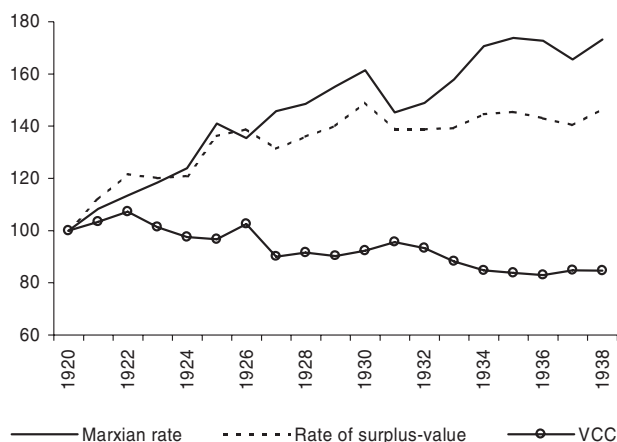
Figure 1 shows two UK interwar macroeconomic rates of profit, the first conventionally defined by the first part of equation (1), and the second as the Marxian definition in the first part of equation (4).

Several points are worth noting. First, the general trend in both rates is markedly positive. In general, the interwar decades were not ones of falling profitability; indeed, rather the opposite. Second, the sharp effect of the 1930–32 contraction is evident in both rates. But it appears as an interruption to an established trend, rather than a turning point. Third, both rates move closely together in the 1920s, but diverge in level, if not in trend, through the 1930s. Using the definitions in equations (1) and (4), the ratio of the Marxian rate to the conventional rate can be expressed after some manipulation as

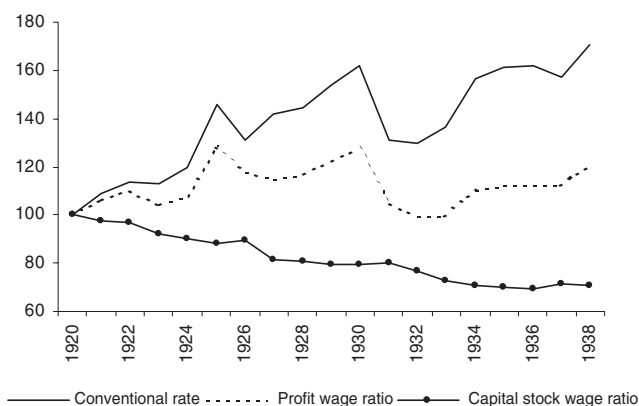
$$\frac{r_m}{r} = \frac{\Pi + W_u}{\Pi} \bigg/ \frac{K_p}{K} \quad (6)$$

so that the rise in this ratio in the years 1930–32 must be due either to a rise in unproductive wages relative to profits, or to a fall in the ratio of productive to total capital stock, or to some combination of the two. There is indeed a negative correlation between the profit rate ratio and the ratio of productive to total capital stock, but it is rather small at  $-0.15$ ; the variation in the profit rate ratio is almost all associated with changes in unproductive wages relative to profits (a correlation coefficient of 0.99).

The decomposition of the Marxian rate of profit according to equation (4) is shown in Figure 2. The rate of surplus-value rose (with some fluctuation) through the 1920s, in particular tracking the Marxian rate closely until 1926, but was fairly flat through the 1930s. The value composition of capital has a falling trend for the whole period after 1922 and in particular its fall in the first half of the 1930s appears to be the proximate explanation of the sharp rise in the rate of profit in those years. None of this is easily compatible with standard accounts of Marxian theory, wherein the rate of profit is supposed to fall because of rises in the composition of capital, and with the rise in the rate of surplus-value a possible counteracting tendency.



**Fig. 2.** *Decomposition of the Marxian rate of profit, UK, 1920–38 (1920 = 100)*



**Fig. 3.** *Marxian decomposition of the conventional rate of profit, UK, 1920–38 (1920 = 100)*

Since the distinctions between productive and unproductive labour and capital are controversial,<sup>23</sup> it is worth remarking in passing that a Marxian-inspired decomposition of the conventional rate of profit (by dividing through by total wages) generates a similar picture, illustrated in Figure 3. But there are significant differences. The profit–wage ratio has a time trend that is both much flatter, and shows much higher variance, than the rate of surplus-value. By contrast, the capital stock to wages ratio fell rather more steeply than the VCC.

### 3.3 Comparisons with earlier work

As mentioned earlier, the interwar period was studied (as part of a longer run investigation) by Cockshott *et al.* (1995, 1996), and it is useful to compare the results obtained by them with those reported here. However, this is not straightforward, because while the data sources are the same, how they are adjusted is not. The main differences appear to be the

<sup>23</sup> For a survey, see footnote 4 above.

following. First, Cockshott and colleagues make no adjustments for General Government. Wages paid by General Government are payments to unproductive labour, and hence such wages do not contribute to money value added. But these wages are financed out of tax revenues.<sup>24</sup> This is important because the analysis of wages and profits is a pre-tax analysis. Consequently, the wages of General Government workers are implicitly included in pre-tax wages and profits, so that if they are counted explicitly as unproductive wages, they are being double-counted.<sup>25</sup> Second, Cockshott and colleagues do not report whether they exclude from money value added imputed rent and the wages paid by households for domestic service. Neither do they report their treatment of the self-employed. Since profit is the residual difference between money value added and total compensation of employees, and money surplus value the residual difference between money value added and productive wages, how these issues are treated will affect the reported results. Third, Cockshott and colleagues allocate all services to the unproductive sector, rather than attempting some estimate of which services are productive, and which are business (financial and commercial) services facilitating the circulation of capital. Fourth, while Cockshott and colleagues distinguish productive from unproductive labour, they make no such distinction for the capital with which these categories of labour work. And, finally, Cockshott and colleagues include productive wages in the denominator of the rate of profit, thereby assuming that wages are paid in advance rather than in arrears.

Consequently, it is not surprising that this study finds some differences from their reported results. The following Figures show these differences,<sup>26</sup> but since it is the time trends rather than the levels that matter, each series is indexed to its 1920 level. In each Figure, CCM denotes the series derived from the data published in Cockshott *et al.* (1995).

The left hand panel of Figure 4 compares profit rates, and the right hand panel Marxian profit rates. While the two profit rates of this study, displayed together in Figure 1, move together (closely in the 1920s, less so in the 1930s), the two profit rates in Cockshott *et al.* (1995) are less closely related. Moreover, the study by Cockshott and colleagues is motivated by the aim of testing whether Marxian propositions hold empirically, but their

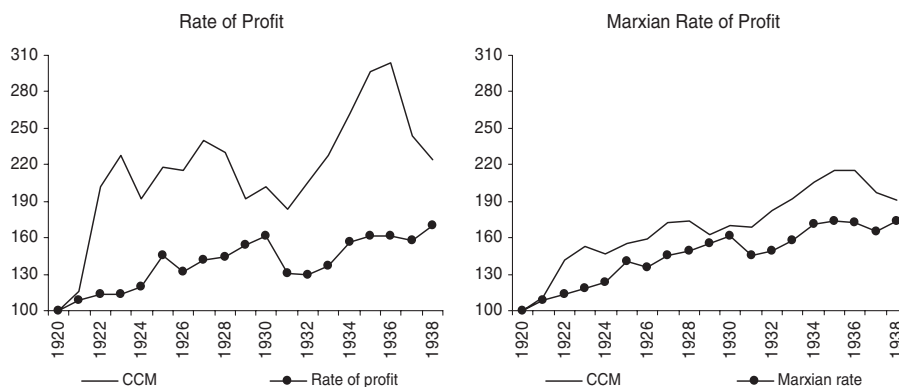
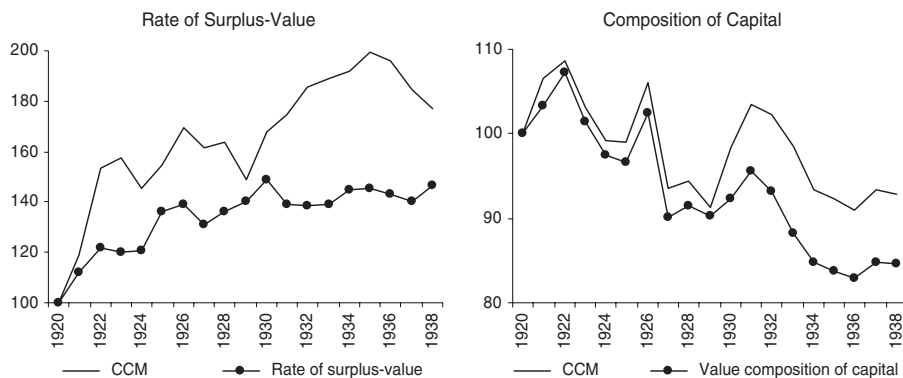


Fig. 4. Profit rate comparisons, UK, 1920–38 (indexes: 1920 = 100)

<sup>24</sup> And by borrowing, but this just serves to complicate matters further.

<sup>25</sup> Moving to a post-tax-and-benefit analysis is fraught with problems, not least because individuals pay taxes, but benefits are typically paid to households.

<sup>26</sup> The data for Cockshott and colleagues are taken from their table 3.2 (Cockshott *et al.*, 1995, p. 121).



**Fig. 5.** Rates of surplus-value and compositions of capital, UK, 1920–38 (indexes: 1920 = 100)

discussion of the rate of profit is one of the Marxian rate of profit. Without any specification of the determination of the macroeconomic rate of profit by the Marxian rate of profit, it is unclear why this latter rate of profit is of empirical interest.

The two panels of Figure 5 compare the components of the Marxian decomposition of the Marxian rate of profit.<sup>27</sup> The left-hand panel compares rates of surplus-value, and the differences are substantial. For Cockshott and colleagues, the 1920s after 1922 was a period of fluctuations in the rate of surplus-value without any sustained increase; this study finds the opposite. For Cockshott and colleagues, the first half of the 1930s saw a very pronounced increase in the rate of surplus-value, followed by a sharp decline after 1935; this study finds a flat trend right through the 1930s. If the rate of surplus-value is an index of class struggle, very different interpretations of both the 1920s and the 1930s are entailed. By contrast, movements in the value composition of capital, illustrated in the right hand panel, are not so very different, although there is some significant divergence in the 1930s.<sup>28</sup>

It is obvious that different definitions and different methodological procedures have substantial effects on measurement and hence on interpretation. It is also the case that there is no generally accepted set of definitions and procedures, which bedevils attempts to create a corpus of theoretically grounded empirical Marxian macroeconomics.<sup>29</sup> Hence all that can be done is to be explicit about definitions, theoretical understanding, methodological procedures and data limitations. Only then can one evaluate whether empirical results are expected or unexpected, and why. In the present case, Cockshott and colleagues do not present a case for why the Marxian rate of profit is anything other than metaphysical.<sup>30</sup> But rather than pursue this further, it is more illuminating to turn to the decomposition of the macroeconomic rate of profit outlined in equations (7), (8) and (11) below.

<sup>27</sup> Note the difference in vertical scales.

<sup>28</sup> Cockshott and colleagues use the expression ‘organic composition of capital’, which is certainly incorrect if their data are in current (rather than constant) prices.

<sup>29</sup> A point made forcefully by Maniatis (1996) in his critique of Cockshott *et al.* (1995).

<sup>30</sup> The issues are clearly laid out in the exchange between Laibman (1993), Moseley (1994) and Wolff (1994).

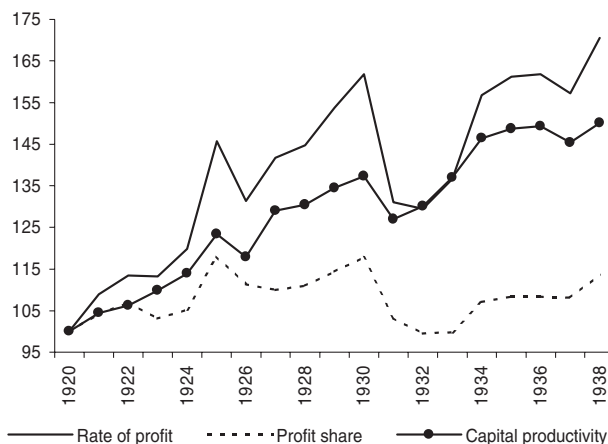


Fig. 6. Rate of profit, profit share and capital productivity, UK, 1920–38 (1920 = 1)

#### 4. Profit share and capital productivity

Conventionally, the profit rate is decomposed into the product of profit share and capital productivity,

$$r = \frac{\Pi}{Y} \frac{Y}{K} \quad (7)$$

Proximately then, the rate of profit changes if there are changes in income distribution between wages and profits, captured by changes in the profit share, and if there are changes in the technologies of production, captured by changes in capital productivity. The decomposition of equation (7) is illustrated in Figure 6. The profit share rose steeply between 1923 and 1925, but otherwise displayed little trend through the 1920s. It then fell steeply between 1930 and 1932, recovered about half this fall by 1934, and thereafter again displayed little trend. By contrast, the graph of capital productivity is similar in trend to that of the rate of profit, but with shallower fluctuations. Hence it appears that the trend in the rate of profit is proximately determined by the trend in capital productivity, and the fluctuations in capital productivity are amplified by movements in the profit share.

##### 4.1 The profit share

The profit share can be written as

$$\frac{\Pi}{Y} = \frac{Y - W_p - W_u}{Y} = \frac{Y - W_p}{Y} - \frac{W_u}{Y}$$

Then, with a similar manipulation as that leading to equation (5),

$$\frac{\Pi}{Y} = \frac{\frac{RY}{H_p} - \frac{w_p}{P_Y}}{\frac{RY}{H_p}} - \frac{W_u}{Y} \quad (8)$$

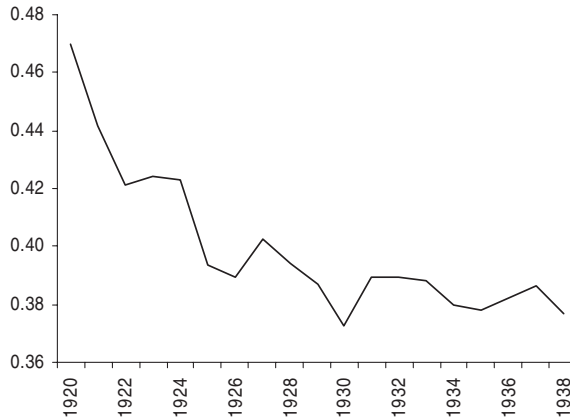


Fig. 7. The value of labour-power, UK, 1920–38

so that changes in the profit share are determined first by changes in the relation between labour productivity and the real wage rate paid to productive workers and second by the wage share of unproductive workers.

4.1.1 *Empirical results* By definition, money value added is the sum of productive wages and money surplus value, so that in terms of share,

$$1 = \frac{W_p}{Y} + \frac{MSV}{Y} \tag{9}$$

The wage share of productive workers is the value of labour-power, and is depicted in Figure 7. It falls through the 1920s, and is flat through the 1930s. Most of the fall in the 1920s is in the first half of the decade, so that from 1926 there is only a shallow fall to the flat trend of the 1930s. Since the value of labour-power is related to the rate of surplus-value by

$$\frac{W_p}{Y} = \frac{1}{1 + e} \tag{10}$$

and the time trend in the rate of surplus-value is, from equation (5), determined by the difference between the time trends of labour productivity and the real wage, it must be the case that in the 1920s this difference is considerable, and in the 1930s slight. This is explicitly shown in Figure 8, where the series are both indexed to 1926 for clarity.

Thus in the 1920s the rate of surplus-value (shown in Figure 2) increased sharply (most of the increase occurring in the first half of the 1920s), and concomitantly the value of labour-power fell, as productivity rose sharply and the real wage rate did not. By contrast, in the 1930s labour productivity and the real wage increased at about the same rate, so that the rate of surplus-value, and concomitantly the value of labour-power, was flat. Hence, since money surplus-value is the sum of profits and unproductive wages, then equation (9) implies that movements in the profit share after 1930 were almost entirely caused by movements in the unproductive wage share. These are depicted in Figure 9.

Figure 9 illustrates that in the first half of the 1920s the rising unproductive wage share dampened the rise in the profit share, but since labour productivity was rising so much



**Fig. 8.** *Labour productivity and the real wage, UK, 1920–38 (1920 = 1)*



**Fig. 9.** *Unproductive wage share and profit share, UK, 1920–38*

more strongly than the real wage, the profit share rose. In the second half of the 1920s, the unproductive wage share was flat, so that, following a mid-1920s fluctuation, the faster rise in labour productivity compared with the real wage rate increased the profit share until 1930. Thereafter, with a flat rate of surplus-value (value of labour-power), the fluctuating movements in the unproductive wage share determined the movement of the profit share.

#### 4.2 Capital productivity

Capital productivity can be written as

$$\frac{Y}{K} = \frac{Y}{K_p} \frac{K_p}{K} = \frac{P_Y R Y}{P_{K_p} R K_p} \frac{K_p}{K}$$

And, dividing through by  $H_p$ ,



$$\frac{Y}{K} = \left(\frac{K_p}{K}\right) \left(\frac{P_Y}{P_{K_p}}\right) \left(\frac{\frac{RY}{H_p}}{\frac{RK_p}{H_p}}\right) \quad (11)$$

Capital productivity is thus the product of three terms:

1. The ratio of the productive to the total capital stock;
2. Relative prices (the inverse of the price of fixed capital relative to output);
3. The ratio of labour productivity to capital intensity (real productive capital per hour of productive labour).

The Marxian theory of technical change presumes that secular increases in capital intensity—what Marx called increases in the ‘technical composition of capital’ (TCC)—are the means whereby labour productivity increases are achieved, which in turn are the driving force behind the production of relative surplus-value. Suppose capital intensity grows faster than labour productivity; then the third bracketed term in equation (11) falls. Provided there are reasons for not expecting dramatic changes in the first two bracketed ratios (as regards the first, because commercial, financial and supervisory activities tend to be less ‘fixed capital intensive’ than those of industrial capital and, as regards the second, because the price of intermediate goods tends to get passed through into final prices), then capital productivity will be driven down. This ‘Marx-biased’ account of technical progress is founded on the increasing difficulty of extracting labour productivity increases from rising capital intensity, and if the real wage grows secularly in line with productivity, the rate of profit too will be driven down. Marx appeared to consider that it was inevitable that capital intensity would rise. But rising capital intensity and more slowly rising labour productivity are not the only logical possibilities. Casual empirical observation of 200 years of industrial capitalism lends some support to the Marxian vision, but long run historical contingency and logical necessity are not the same thing. Over shorter run periods, technical progress may not be Marx-biased.

*4.2.1 Empirical results* Equation (11) determines capital productivity as the product of three terms, the share of the capital stock worked by productive labour, a relative price term, and the ratio of labour productivity to capital intensity. The first term, the share of the capital stock worked by productive labour, shows no trend over the period. It averages 76% and its coefficient of variation is only 0.7%. The second term is a ratio of deflators, measuring the price of output relative to the price of the capital stock. After a sharp rise in 1920–21 (attributable to wartime recovery), this relative price increased by an average of about 0.8% per year from 1921 to 1933 (increasing nominal capital productivity as the relative price of fixed capital fell), and thereafter fell by an average of less than 0.2% per year to 1938 (reducing nominal capital productivity as the relative price of fixed capital rose). While not negligible, these are not dramatic changes. Indeed, this price series has a coefficient of variation over the whole period after 1921 of about 3.5%, whereas capital productivity as a whole has a coefficient of variation of more than 11.5% over the same period. Both trend and fluctuations in capital productivity are largely determined by the trend and fluctuations in the third term, the ratio of labour productivity to capital intensity.

The long run history of capitalism is one of capital deepening, as increasingly mechanised techniques are adopted in pursuit of profitability. But it is not the case that these techniques



Fig. 10. Labour productivity and capital intensity, UK, 1920–38 (1920 = 1)

all co-exist, to be selected on the basis of changing factor prices.<sup>31</sup> Rather, the technique that is adopted is the most technologically advanced (that is, labour-saving and means-of-production-using) of its day, and it is adopted because that is the primary way in which labour productivity can be increased.<sup>32</sup> Marx theorised this relationship between capital intensity and labour productivity in terms of what he considered a necessary tendency in capitalist development for the ‘technical composition of capital’ to rise (Marx, 1976, ch. 25, section 2).<sup>33</sup> His concept of the technical composition of capital is proxied here by a constant price measure of the fixed (productive) capital stock per hour of (productive) labour, and this is the measure of capital intensity in equation (11).

The time trend of labour productivity is depicted in Figure 8. Figure 10 shows the same time trend but in index form for comparison with the time trend of capital intensity. If the exceptional year of 1920–21 is omitted, labour productivity grew by some 24% from 1921 to 1930; over the same period, capital intensity fluctuated but did not increase at all. And from 1931 to 1938, labour productivity grew by some 11% while capital intensity fell by some 11.5%. That is, in the decade of the 1920s, labour productivity increased substantially, but not through any rise in capital intensity; and in the 1930s capital intensity fell but labour productivity continued to increase.

## 5. Interpretation

Combining profit share and capital productivity, movements in the rate of profit are fundamentally determined by the difference between real wage growth and productivity growth, and by the difference between productivity growth and capital intensity. They are also determined by changes in the relative weight of the productive and unproductive sectors, that is by structural shifts of weight between production and circulation, and additionally by the changing weight in employment structure between supervisors and the supervised.

<sup>31</sup> As would be implied by a neoclassical approach. Then movements along a production function are not sufficient to explain observed growth, and recourse must be had to unexplained shifts in the production function because of ‘total factor productivity’ changes.

<sup>32</sup> The history of this biased technical change could be described by a production function, but it would describe historically superceded technical changes, which is why such a function is described as a ‘fossil’ in Foley and Michl (1999) and Michl (1999, 2002).

<sup>33</sup> Marx’s measure was the ratio of means of production to labour-power in terms of use-values. But the heterogeneity of use-values renders this impossible to measure.

From the end of the First World War to the mid-1920s, capital was very successful in reimposing its prerogatives over labour: real output per hour increased much faster than the real hourly wage rate, so that the rate of surplus-value increased sharply and correspondingly the value of labour-power fell sharply. In part this was a matter of transition from a partially planned war economy to a market-based peacetime economy. Idle fixed capital was brought back into use, and labour productivity correspondingly benefitted. But net additions to the stock of productive fixed capital were negligible in trend terms after 1921, so that after the mid-1920s the rate of productivity increase slackened. Indeed, from 1929 through to 1938, the rate of surplus-value (and correspondingly the value of labour-power) were flat as labour productivity only grew at about the same rate as the real wage rate.<sup>34</sup> In terms of the balance of class forces, while labour was severely weakened by mass unemployment, capital could not take advantage because of the collapse in world markets. The comfortable corporatism engendered by the shelter of protectionist tariffs was not a period of intense class struggle. Indeed, for capital, the adverse effects of a return to gold at an overvalued exchange rate and the collapse of the international economy into a protectionist, semi-autarky just about counterbalanced the positive effects of the General Strike victory and the rapid rise of unemployment. Apart then from the first half of the 1920s, the rise in the rate of profit did not have as a contributory factor a rise in the rate of surplus-value.

Rather, the rate of profit was driven up by the maintenance of productivity growth while capital intensity fell. This is a rather different pattern from that envisaged as the general or typical case by Marx. For Marx-biased technical progress entails falling capital productivity as production becomes more mechanised and as it becomes progressively harder to extract labour productivity increases from capital deepening. This is not an adequate characterisation of the interwar years in the UK—indeed, rather the converse. Capital productivity rose as labour productivity increased while capital intensity fell.

There could have been a number of reasons why labour productivity rose in the absence of capital deepening, and these are now explored.

### 5.1 *Labour quality*

First, there could have been an improvement in the quality of labour. Average years of formal schooling did increase over the period, but only by about half a year per decade, and increases in university education were tiny. As regards technical education (apprenticeships), there is no data, but it seems that less than 20% of male school-leavers aged 15–17 were apprenticed. All of this resulted in no change in the absolute number of skilled manual workers in the census years of 1921 and 1931, implying a fall in the percentage of skilled manual workers in the labour force.<sup>35</sup> Even if there was improvement in the quality of education itself, it appears that, for the interwar period as a whole, it is difficult to believe there was any significant increase in the quality of the labour input.

<sup>34</sup> This is not the place to pursue an investigation of why growth in output was comparatively muted and unemployment stubbornly high over the interwar period, but it is perhaps worth noting here that the fall in the value of labour power in the 1920s and its failure to recover during the 1930s may have limited growth in domestic demand for consumption goods, and thereby curtailed expansion of the emerging consumer durable industries. Bowden (2003, pp. 358–9), for instance, argues that the comparatively low level of income of the majority of the population meant that the increase in the amount and variety of consumption goods fell short of creating the conditions for mass consumption in this period.

<sup>35</sup> See Matthews *et al.* (1982, ch. 3, pp. 102–12) for further details.

### 5.2 *Work intensity*

A second possibility was that there was an increase in the intensity of work. The basic idea is that reductions in hours of work of full-time workers typically do not translate *pari passu* into reductions of labour input, because work intensity is increased. This in turn might be due to less fatigue (hence fewer mistakes, higher quality output and higher output per hour), or to the imposition by management of more efficient working practices to compensate for the reduction in working time.<sup>36</sup> In 1913, average hours worked were 2,753 (56.4 hours per week for 48.8 weeks). Following the reduction in standard hours in 1919, average hours worked had fallen by 1924 to 2,219 (46.6 hours per week for 47.6 weeks), a fall of 19.4%.<sup>37</sup> Increases in intensity might, therefore, have some role to play in the strong productivity growth of the early 1920s. But it cannot explain the sustained productivity growth through both interwar decades, because by 1937 average hours worked had increased by 3.3% to 2,293 (48.2 hours per week over 47.5 weeks).

### 5.3 *Fixed capital quality*

A third possibility was that there was an increase in the quality of the fixed capital stock. In part, there might be bias in the relevant price indices. If the price indexes of fixed capital goods are derived from the unit cost of circulating capital (materials and labour), they will miss any improvement in productivity in fixed capital goods industries. Similarly, if there is improvement in the quality of fixed capital goods over time, and there is a similar increase in their cost of production over the lower quality goods of the base year, then the higher quality goods should receive higher weights; but the physical units to which the price data refer cannot distinguish different qualities. Then too much of the technical change will be attributed to price changes and not enough to (constant-quality) quantity changes, and the constant-price measure of the fixed capital stock will be understated.<sup>38</sup>

But there is more to this than biased price indices. Matthews *et al.* (1982, pp. 384–5) argue that the fall in the capital output ratio (the rise in capital productivity) cannot be simply a matter of the disposal of redundant capital because the capital output ratio fell in industries without any apparent legacy of excess capacity. Rather, they offer as an explanation, at least in part, the progressive electrification of UK manufacturing during the inter-war period. Not only were firms changing to electricity as a source of power (53% of horsepower in manufacturing in 1924, 66% in 1930, and 91% in 1951, with most of the 1930–51 increase taking place in the 1930s); they were increasingly purchasing electricity from outside the firm, rather than generating it internally (47% purchased in 1924, 56% in 1935). Indeed, horsepower per worker in manufacturing increased by 21% between 1924 and 1930, much more than the constant price fixed capital stock per worker. Not only is there the statistical issue of the adequacy of the measurement of quality change, there is also the issue of whether electrification engendered a significant capital saving bias to

<sup>36</sup> In neoclassical terms, it is next to impossible in practice to disentangle the 'pure' effects of increases in intensity resulting from a reduction in full-time hours from the effects arising from induced improvements in organisational efficiency. In the framework of a labour theory of value, such a separation is not important.

<sup>37</sup> See Matthews *et al.* (1982), Appendix D.

<sup>38</sup> See Matthews *et al.* (1982), Appendix F.

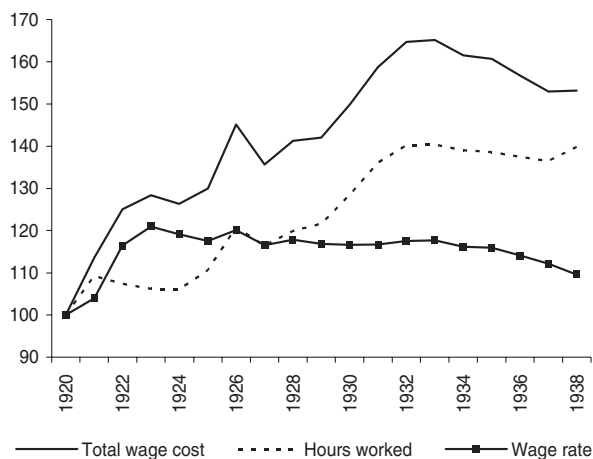


Fig. 11. Ratios: unproductive to productive labour (1920 = 100)

technical change, allowing more efficient and flexible use of machinery, and enabling greater supervision and control over workers and thus gains in labour productivity.<sup>39</sup>

#### 5.4 Unproductive labour

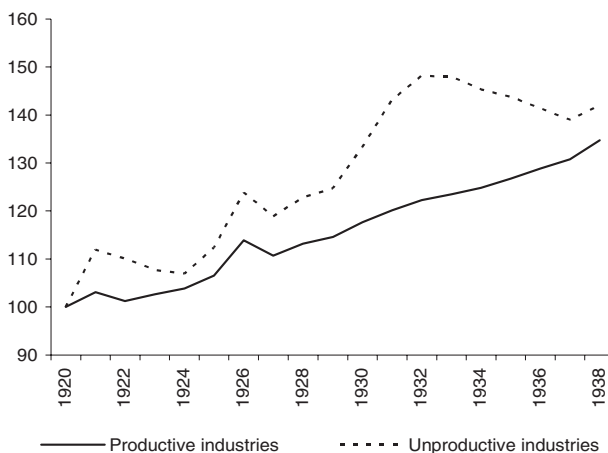
A final possibility concerns the steady and significant increase (40% over the whole period) in the proportion of unproductive labour in the total workforce. Occupation data indicates that the proportion of supervisory/managerial and clerical labour employed in production increased significantly over the interwar period, and raises the question of whether this acted not only to retard the rise in the rate of profit as an increasing cost to capital, but perhaps also acted to increase the rate of profit through greater supervision of workers and more efficient management of resources—a ‘managerial revolution’ enabling sustained productivity growth in the absence of Marx-biased technical progress.

An increase in the weight of unproductive labour in the economy is a marked feature of the interwar years. Figure 11 shows the ratio of the total wage compensation of unproductive to productive labour, indexed on 1920. This ratio rises from 0.47 in 1920 to 0.78 in 1933, falling to 0.73 in 1938—an increase of 53% over the whole period.

In the early 1920s, the increase in the total wage cost of unproductive labour relative to that of productive labour was largely a result of a pronounced increase in the comparative wage rate, which rose by 21% between 1920 and 1923, but this ratio thereafter declined, ending the period just 10% above its 1920 level.<sup>40</sup> After 1923, the ratio of total wage cost was driven by an increase in relative hours rather than relative wage rates. The increase in the total hours employed by unproductive relative to productive labour rose by 40% to

<sup>39</sup> In a study of manufacturing labour productivity, Ristuccia and Solomou (2002) find an acceleration of British labour productivity growth over the second of the inter-war GDP cycles, and a strong positive relationship between electricity diffusion and labour productivity growth.

<sup>40</sup> In absolute terms, the ratio of wage rates of unproductive to productive labour was 1.30 in 1920, 1.56 in 1926, 1.53 in 1933 and 1.43 in 1938.



**Fig. 12.** *Hours worked, by unproductive labour in productive industries, and by all labour in unproductive industries, relative to total productive labour (1920 = 100)*

1933, remaining broadly flat thereafter,<sup>41</sup> suggesting that there was a significant restructuring of the economy throughout the 1920s and early 1930s, but that this had run its course by 1933.

The unproductive labour figures are an aggregate of all labour in the unproductive industries, and unproductive labour in productive industries. Whereas the latter category was greatly affected by the output slump of the early 1930s, this was not so for the unproductive industries, which remained largely impervious to the fall in production. It is this feature that gives shape to the hours-worked ratio over the 1930s. Figure 12 breaks down the aggregate figures to show separately ratios of total hours employed in the unproductive industries and total unproductive hours employed in the productive industries, both relative to total productive hours employed. The disaggregated figures make it apparent that throughout the inter-war period there was steady growth in the comparative weight of unproductive labour within the productive industries, and more volatile, but nonetheless persistent, relative growth of total hours employed in the unproductive sector.

Within the productive industries, by 1938 total unproductive hours employed had increased by 34.7% relative to productive hours. In part, this was due to changes in the relative mix of industries that comprise the productive sector, but this accounted for only 8.8 percentage points of the increase.<sup>42</sup> The remaining 25.9 percentage point rise was due to a within-industry increase of total hours employed of unproductive relative to productive labour.

Strictly speaking this was an increase in hours employed of salaried relative to waged labour, and using these categories as proxies for unproductive and productive labour gives rise to a number of anomalies. The published data include under salaried staff some productive labour: certain professional and technical staff—engineers and technicians for instance—as well as the productive functions of administrative and managerial staff. On

<sup>41</sup> In absolute terms the ratio of hours worked of unproductive to productive labour was 0.36 in 1920, rising to 0.51 in 1933 and in 1938.

<sup>42</sup> Calculated following the method outlined in Routh (1965, p. 41).

the other hand, some unproductive labour is included under waged staff: supervisors and inspectors, for instance. A useful cross check for the salaried/waged labour data is Routh's (1965) study of occupation and pay in Great Britain for the census years 1911 to 1951. The occupational data show a clear increase in managerial, supervisory and clerical staff as a proportion of the workforce, particularly over the period 1931–51. After adjusting the raw data to eliminate the effect of change in the industry mix, Routh (1965) finds that the employed hours of supervisors experienced the greatest increase in proportion over both 1921–31 and over 1931–51: increases of 13% and 56%, respectively.<sup>43</sup> The proportion of clerical staff in the workforce increased by just 2% over 1921–1931, but by 38% over 1931–1951, the second highest increase in proportion after that of supervisors. Taking a longer run view, over 1911–1951, and after adjusting for change in the industrial mix, the cumulative increase in hours employed of supervisors was 83% and that of clerical workers 77%, both much greater than the third largest change, an increase of 27% for 'Higher Professionals' (Routh, 1965, p. 42, table 19).

There was also a clear trend in mining and manufacturing from 1931 on for the number of managers, as a proportion of the total workforce and relative to employers, to rise. In 1921 there were approximately twice as many employers as managers, with employers making up 2.3% of the total workforce and managers 1.2%, and a similar ratio obtained in 1931 (employers 2.0%, managers 1.0%). But by 1951 there were four times as many managers as employers: employers constituted only 0.6% of the total workforce whereas managers accounted for 2.4%.<sup>44</sup>

The unproductive industries figures presented here are an aggregation of the Distributive Trades, Finance (including insurance and banking) and Professional Services.<sup>45</sup> This latter group is a wide category and includes many professions largely or wholly employed outside the circuit of capital (teachers, medical staff, the clergy and lawyers as well as accountants, consultant engineers and architects). Total hours employed in all three groups grew by similar extents over the inter-war years: 38%, 32% and 42%, respectively, greatly exceeding the 13% increase in the working population over this period [and thus largely retaining relative proportions (of all unproductive industries) over the period of 67.5%, 13.2% and 19.3%, respectively, in 1920 and 67.4%, 12.7% and 19.9% in 1938]. It is tempting to speculate on the reason behind this growth in employment hours in unproductive industries. Growth in distribution could be associated with the development of mass consumption and capital's need to sell an expanded product; the increase in finance could be associated with both the concentration and centralisation of capital, and the expansion of credit to finance personal

<sup>43</sup> Routh (1965, p. 42, table 19). Figures adjusted to the 1951 distribution of occupations across industry, the first year such cross-tabulation was available.

<sup>44</sup> Routh (1965, p. 20, table 7, p. 23, table 8 and p. 40, table 18). The nationalisation of the coal industry will of course affect the interpretation of the 1951 figures for Mining.

<sup>45</sup> Some further issues with the data should be noted. First, unproductive labour includes the residue of miscellaneous services after accounting for the productive elements (entertainment, laundry and catering); a proportion of the wage figure could have been allocated to productive labour but the numbers are so small as to make no difference either way. Second, unproductive labour includes directors' fees of the 'not allocated by industry' sector, whereas directors' fees are subsumed under salaries for all other industries. Arguably, they should not be so included, since the wages of the 'not allocated by industry' sector have been excluded entirely because of the absence of corresponding numbers employed. Again, these numbers are very small, making little difference to the main aggregates. Third, both miscellaneous services and directors fees not allocated by industry have been excluded for simplicity from the unproductive industries breakdown (including them, miscellaneous services would account for around 5% and directors fees not allocated for 11% of remuneration in the unproductive industries, and miscellaneous service about 3% of the numbers employed).

consumption. But reasons why Professional Services should have expanded to an even greater extent are not so readily apparent. Clearly these are all areas for further study.

In general, the figures are consistent with the view that this period saw the beginnings of a significant rise of a managerial/clerical bureaucracy. This was always implicit in the separation of ownership from control, but it required the steady demise of the family firm as consequences of the concentration and centralisation of capital, and the tendency to revolutionise the means of production. As the family firm declined, it was replaced by the modern corporation, characterised by the growth of a managerial and hierarchical stratum of functionaries between labour and capital, the upper echelons strongly identifying with the interests of capital, and the lower echelons of office workers (from highly specialised and well-paid technical staff with considerable job-autonomy through to poorly-paid clerical staff engaged in highly routinised and monotonous activities) occupying an ambiguous terrain. To the extent that the tasks of these 'white collar' functionaries are oriented towards managerial, financial and commercial activities, they are unproductive. But they are also profit-rate-maximising (Duménil and Lévy, 2002, 2011); they require little investment in fixed capital, and hence, *ceteris paribus*, can, under certain historical circumstances, contribute to rising capital productivity.

However, the rise of the modern corporation poses a further issue. This paper has said nothing about the role of finance and the City in the interwar period. In the US economy, the rise of the modern corporation, and its associated managerialism, was associated historically with the rise to a dominant position of 'finance', a collection of institutional relationships concerned with the sale and purchase of securities, set somewhat apart from direct participation in industrial production. This dominance was seriously undermined by the post-1945 quasi-social-democratic consensus, with its acceptance of state interventions in the economy, a commitment to full employment, and the establishment of social welfare systems to underpin living standards. But it was re-established again around 1980. An important issue concerns whether a similar pattern exists for the UK. There were significant differences between the US and the UK economies, but a similar periodisation as in the US does not seem fanciful, despite their very different politics. In particular, the generally rising rate of profit and rising capital productivity, depicted in Figure 6, is similar to that obtaining in the USA after 1932. Such sustained upward movements are historically associated with large-scale economic transformations, and there seems little reason to exclude the UK from that pattern. This suggests a considerable research agenda.

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