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Has UK capitalism transformed? Reassessing surplus value distribution and unproductive labour, 1992–2020

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Abstract

UK capitalism transformed significantly from 1992 to 2020, yet national accounts have rarely been reinterpreted through Marxist categories. Unlike US data, UK data resists such analysis, despite the need for interpreting the UK economy in terms of value, surplus value creation and appropriation. Using the New Interpretation framework to reassess the UK economy, we distinguish unproductive from productive labour, using Office for National Statistics macroeconomic data and UK socio-economic micro-datasets. The UK surplus value rate is analysed through its key drivers – productivity, income distribution and working hours – while incorporating the unproductive–productive labour ratio as an additional determinant. Our findings show the production sphere remains central: the 2008 crisis emerged there before the wider economy, challenging narratives of crisis in finance, and the fall in surplus value ahead of 2020 shows the crisis predated the pandemic. UK capital responded through increased exploitation, suppressing

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wages, while Labour governments stressed productivity and Conservatives' workweek extensions.

Keywords
capitalism, capitalist crisis, Marxism, productivity puzzle, surplus value, unproductive labour

JEL classification: E11, J81, J82

Introduction

This study repurposes UK national statistics data to uniquely derive Marxian categories capable of capturing capitalist transformation and socio-economic dynamics since the 1980s, based on surplus value extraction and the organisation of labour. While researchers have developed macroeconomic models to explain patterns in national economies, especially in the United States, data for the United Kingdom is not immediately amenable to such treatment. This article introduces a novel methodology to examine the UK economy, from 1992 to 2020, focusing on the dynamics of surplus value (SV) which is a distinct Marxian category. SV and its components, including absolute surplus value (ASV) and relative surplus value (RSV), are analysed together with UK data on unproductive labour (UL) and productive labour (PL), to offer unique and novel insight into the dynamics of the economy, including the so-called productivity puzzle.

In Marxian approaches, PL is defined as activities directly contributing to value creation, whereas UL does not. The rate of SV, calculated as the ratio of SV (profits, interest, and rent) to variable capital (V) (wages paid to productive workers), serves as a distributive measure and causal variable. We also construct an indicator with SV relative to total employees' compensation (W), capturing economy-wide distributional dynamics independent of UL and PL distinction. Socio-economic distributive analyses, such as those of Marx (1976 [1867]), have highlighted how SV rates respond to production-related factors like working hours, technological change and labour intensification, and vice versa. Building on this foundation, we employ the New Interpretation (NI) framework (Duménil, 1983–4; Foley, 1986; Mohun, 1994, 2004), which divides net output into aggregate wages and profits.

Two of the leading empirical approaches in Marxian economics are input–output (IO)-based approaches, such as that in the Shaikh–Tonak tradition, and NI approaches, associated with Foley and others, which work primarily with national income (value-added) data. Here, we follow the NI rather than IO methods. NI uses the monetary expression of labour time ($melt$) to relate net output and income distribution directly to living labour and the split between necessary and surplus labour. It links total prices with total values and total profits with total surplus value, providing a distributive analysis grounded in real wages and profits. Alternatively, Cockshott et al. (1995) use UK national accounts and a sectoral, IO-informed classification, to test the correlation between values, prices of production and market prices at the industry level, without incorporating occupations or NI concepts. Using different methods, these approaches

evidence the validity and relevance of Marxian theory, demonstrating its compelling nature in multiple empirical constructs. Our approach is complementary to, but distinct from Cockshott et al. (1995), and advances the NI framework by uniquely combining the Standard Industrial Classification (SIC) and Standard Occupational Classification (SOC) to separate UL from PL in the UK context. Specifically, we use *Understanding Society* and the *British Household Panel Survey* (*BHPS*) to proxy ratios, prior to decomposing macroeconomic data from the Office for National Statistics (ONS). Rather than narrowly focusing on resolving the transformation problem, the NI offers flexibility regarding heterogeneous labour (as expected to be found in a micro-level) and is applicable to contemporary national accounts (that are suitable for a macro-analysis).

The study builds on a literature that has explored alternative measures of capitalist economies, including, but not limited to, Morishima (1973, 1976), Wolff (1979, 1988), Weisskopf (1985), Moseley (1985, 1987, 1988), Gouverneur (1983, 1990), Shaikh and Tonak (1994), Mohun (2005, 2006), Maniatis and Passas (2013), Rieu and Park (2018), Rotta (2018, 2022), Cogliano (2018), Qi (2018), Jeong and Jeong (2020), Freitas (2021) and Pauls (2022). These works have examined SV, its calculation, components and relationship to capital accumulation. Our analysis extends this research, investigating changing patterns of UL–PL in the UK economy. Key findings include (1) establishing a negative relationship between the UL–PL employment ratio and productivity, particularly after the 2008 Financial Crisis and (2) demonstrating a positive (possibly short-term) relationship between the UL–PL employment ratio and the SV rate. These results shed light on the UK's productivity problems and demonstrate how changing compositions of labour categories shape economic outcomes.

UL and PL and their role in UK capitalism

A three-dimensional Economic PL Labour Classification System

The distinction between UL and PL provides a critical lens for understanding the structural dynamics of contemporary capitalist socio-economies. In the UK context, this distinction helps explain key trends in economic performance, including productivity, and SV production. By developing an empirical categorisation of UL and PL, this article provides a framework to analyse how shifts in labour composition have shaped UK capitalism from 1992 to the onset of the Covid crisis. We build on the previous studies of Gough (1972), Shaikh and Tonak (1994), Mohun (1996, 2002, 2003, 2004, 2005, 2014), Savran and Tonak (1999) and Cockshott et al. (1995). While Gough (1972) reopened the classical debate by insisting that the UL–PL distinction must be grounded in the capital relation rather than in technical criteria, and by centring value creation in the sphere of production, Shaikh and Tonak (1994) provided our industrial and ownership-based benchmark: we adopt their rule classification where PL is wage labour employed by private capitalist enterprises in value-creating industries, and that labour in state services, commercial, financial and many social-maintenance activities is unproductive. Mohun (1996, 2002, 2003, 2004, 2005, 2014) adds the crucial occupational dimension. Mohun's work is one catalyst for our NI approach with distinction between UL–PL, and we extend it to the UK context. Savran and Tonak (1999) clarify the conceptual defence of a strict

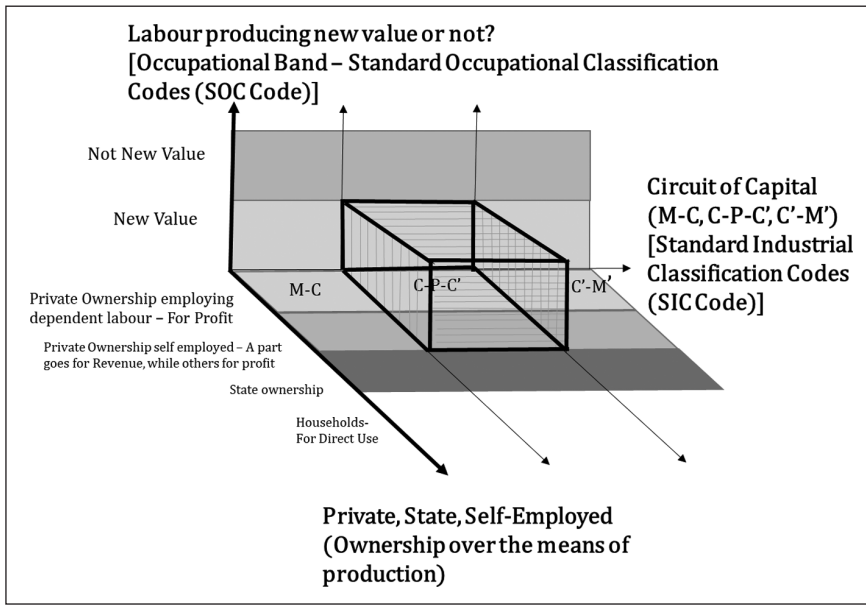

Figure 1. Economic Productive Labour Classification System (EPLCS).

value-theoretic UL–PL boundary against arguments to collapse the distinction into mere usefulness, which underpins our refusal to treat all service work as productive. Finally, Cockshott et al. (1995) offer the main UK precedent, using a related IO framework to classify industries, however, without incorporating occupational information or an NI-based treatment of surplus value. Thus, we derive an *Economic Productive Labour Classification System* (EPLCS) guided by Marx (1969a, 1969b, 1972) based on the following three dimensions:

1. Type of ownership (indicating the extent of capitalist relations);
2. Industrial classification (reflecting placement in the circuit of capital: capital advance, valorisation and realisation, or the spheres of circulation, production and realisation respectively);
3. Occupational classification (to enable clearer distinction of UL–PL as industries contain unproductive roles, for example, supervision, security, enforcement, that in the UK data are not involved in productive activities).

This system, the structure of which is summarised in Figure 1 and explained below, provides a basis for the UL–PL distinction and, as shall be demonstrated in this article, sheds light on the UK economy, including the productivity puzzle, class conflict over extensive labour utilisation and crises.

Because our aim is to translate Marx's categories into the structure of UK data, the first distinction begins where capitalist production itself begins: *ownership*. Ownership type is a pivotal criterion because it reflects the extent to which capitalist relations

dominate socio-economic outcomes. In using ownership as one of our three criteria, we do not claim that state labour is inherently unproductive in all contexts; the underlying issue is whether the employing unit actually functions as capital, producing commodities or services for sale, and realising surplus value. In the United Kingdom the mixed economy complicates this: the scope for genuinely value-creating state enterprises is extremely limited. Our criteria are context-specific (UK) and we acknowledge that while this method could be generalisable to other Western economies like the United Kingdom, it might not apply to countries like China where capital accumulation is heavily centred on the state sector. Therefore, in the United Kingdom, after decades of privatisation, there is next-to-no state-owned manufacturing, energy or large-scale commercial production, and most state employment is concentrated in tax-funded general-government activities such as the National Health Service (NHS), education, public administration, policing and defence. In our analysis, for example, while private sector health and education workers are classified as PL, public sector counterparts are not, as they operate outside of direct capitalist production relations. And, the ongoing push for privatisation, evident in debates over the NHS, aims to absorb these sectors into the standard capitalist sphere, thereby expanding the pool of SV producing PL. Therefore, the NHS, as a state-owned entity providing free services, is part of the unproductive sector. Higher Education on the other hand is considered productive, despite the 'charity' status of UK universities, because the end product is for sale (e.g. tuition fees). Classifications highlight the public and private sector distinction and underscore how changes in ownership can alter the balance between UL and PL, with ramifications for productivity and SV.

Our classification of public education and health sectors as lying outside the productive sector does not assume that knowledge does not generate SV. Rather it is based strictly on the public nature of their ownership, which places them outside direct capitalist production relations. This distinction is crucial for understanding the dynamics of SV generation in the UK economy. For example, Rotta (2018) and Teixeira and Rotta (2012) treat knowledge and information (e.g. media production, publishing and data processing) as unproductive 'valueless' commodities, based on 'costless' reproduction. Without elaborating extensively on the controversies about knowledge activities, we reject the notion that 'intangibility' equates to 'immateriality' or that mental labour producing non-physical outputs is inherently unproductive. In our framework, knowledge work is not excluded from the productive category simply because it produces intangible outputs. For instance, an IT programmer in the private sector is classified as productive, as their labour directly contributes to value creation. By contrast, senior managers in the same firm, whose roles primarily involve supervision rather than value creation, are classified as unproductive. Knowledge occupations are not treated uniformly but are assessed using the three criteria in our system (Teixeira and Rotta 2012).

The second distinction follows directly from the logic of the circuit of capital, which provides the structural map for identifying where value is created and where it is merely transferred or realised. As such, the second dimension of our system is based on the economic circuit of capital: $M \rightarrow C \ldots P \ldots C' \rightarrow M'$ (see Shaikh & Tonak 1994). This captures the functional phases: capital advance ($M \rightarrow C$), valorisation ($C \ldots P \ldots C'$) and realisation ($C' \rightarrow M'$). This circuit begins with an initial investment of money (M), used to purchase capital (C), representing capital advances. Through the production process (P), new

commodities are produced (C'), representing the valorisation process (a process of value augmentation), which are then sold on the market, realising their value in monetary form (M'). Building on this logic, PL is defined as work used in the valorisation process while UL facilitates the capital advance or the realisation of surplus value (and the value of the commodity as a whole) and is included in costs associated with circulation that do not add value to commodities (see Mohun 1996). To motivate capitalists the production process must generate the expectation of a surplus ($M' > M$), ensuring that the final output value exceeds the initial input ($C' > C$), regardless of whether this surplus is realised in the market or not. Industry placement therefore represents which sphere of the circuit dominates an activity, making the distinction directly applicable to UK SIC categories.

Our classification system maps labour's role in this circuit according to the industry it operates in (horizontal axis of Figure 1). For instance, an economy dominated by financial activities ($M \rightarrow C$) may exhibit different patterns of value creation and distribution compared with one focused on manufacturing ($C \ldots P \ldots C'$). However, we cannot acquire the granularity of US data for the United Kingdom. And it is precisely the circuit of capital in the UK data that introduces complications not present in US applications of the framework. Using 2-digit UK SIC codes means that broad categories such as transportation (SIC 49–53: Transport and Courier) appear as unified industries, and under our industry criterion they are therefore treated uniformly as PL, even though the labour process within them contains both valorising and circulatory functions, as described in Shaikh and Tonak (1994), where there is PL of transportation and UL of transportation.

To address this, the third dimension in our system turns to the labour process itself, where SOC codes allow us to separate valorisation labour from the supervisory and circulatory functions within productive industries, that Marx treats as unproductive. Labour that produces commodities or directly produces, trains, develops, maintains or reproduces labour power is deemed productive, provided it operates directly within capitalist production relations (Marx 1969a: 172). This criterion is important because the UL–PL ratio reveals much about the dynamics of present and future SV generation. A high UL–PL ratio can signal constraints on value creation, as UL while necessary for maintaining capitalist structures does not directly contribute to SV.

Even within traditionally productive sectors, such as manufacturing, some labour involves supervision and circulation that does not create new value. For example, private sector security personnel, who maintain capitalist property relations, are classified as unproductive. Similarly, supervisory roles that focus on oversight, rather than planning and organisation, are deemed unproductive, even if they occur within productive sectors. This distinction helps explain why a contraction in PL can jeopardise the sustainability of SV extraction, thereby weakening capitalism.

This criterion is represented by occupation, particularly by SOC codes in the empirical sphere. While this approach introduces some complexities – for instance, management roles often combine supervisory and planning functions – it provides a practical method for distinguishing UL and PL. We follow Mohun's (1996) treatment of supervisory labour, classifying all SOC 01 (Managers) roles as unproductive, due to their focus on oversight rather than value creation. However, we acknowledge that some managerial labour involves

organising productive activities, which Marx (1976: 505) recognises as productive. While this level of granularity is difficult to operationalise, aspects of productive planning may still be captured in roles such as administrative and secretarial support (SOC 4).

Mixed income within the EPLCS

The treatment of mixed-income categories, such as the self-employed, adds further complexity. While some self-employed individuals closely resemble wage workers and may be classified as PL, others are more akin to small business owners. The self-employed, though a relatively small component of national income, play a significant role in economic activity and require careful categorisation.

There are a variety of ways the self-employed can be treated in relation to the wage share, which is analogous to the problem under consideration here. Dunn et al. (2018) identify the following methods:

1. Do not incorporate any mixed income into the wage share;
2. Allocate all mixed income into the wage share;
3. Allocate a fixed proportion of mixed income into the wage share;
4. Inflate the wage share based on the number of self-employed (where self-employed income is assumed equal to the average income of an employee);
5. Allocate mixed income to the wage share based on the factor share of other income categories (following Appleton 2011).

In this study, we adopt the fifth approach, allocating mixed income to SV and V in proportion to the rate of SV. We utilise the SOC and SIC codes to categorise recipients by occupation and sector, determining their productive status (see Supplemental Appendix 1). Mixed income in productive employment comprises those who are self-employed in the private sector, in occupational bands that produce new value and in productive industries concerned with transforming commodities into new commodities through the production process ($C \ldots P \ldots C'$). We categorise the wage component of mixed income in unproductive employment as a component of surplus (e.g. a self-employed accountant). By contrast, the wage component of mixed income in productive industries is the split between those that are found in productive self-employment, and those who are not.

The relationship between UL and PL has significant implications for economic growth and stagnation. While some theories suggest that faster growth in unproductive activities follows periods of productive stagnation (Baran and Sweezy 1968; Magdoff and Sweezy 1988 and Harvie 2005), others argue that productive stagnation is a consequence of prior rapid growth in unproductive sectors (Cockshott et al. 1995; Moseley 1985, 1992, 1994; Mohun 2005, 2006, 2014; Paitaridis & Tsoulfidis 2012; Shaikh & Tonak 1994; Tsoulfidis & Paitaridis 2019; Tsoulfidis & Tsaliki 2014; Wolff 1987). Shaikh and Tonak (1994) argue that increasing unproductive expenditures may increase demand and productive output in the short run, but it reduces the rate of productive growth over the longer run, a thesis supported by the empirical analysis of Rotta (2022).

Surplus value measures for UK capitalism: an aggregate model

The NI, developed by Duménil (1983-4), Duménil and Levy (1987) and Foley (1986), analyses macroeconomic data, bridging the gap between monetary aggregates and labour-time categories. As stated earlier, we transcend IO methods by shifting the focus from commodity flows (through inter-industry matrices) to the underlying class relations expressed in net output. At its core, the NI uses the monetary expression of labour time ($melt$) to translate monetary data, such as wages and profits, into labour-time equivalents. Dividing net output into aggregate wages and aggregate profits allows for a unique way of directly linking value and price via labour income. This income division also permits the corresponding division of the production-related categories of necessary labour time (NLT, the time required to produce wages) and surplus labour time (SLT, the time generating profits, interest and rent). The ratio of SLT to NLT provides an alternative measure of the SV rate, offering insights into the working day's division expressed in the distribution of economic output between workers and capitalists.

Another distinct aspect of the NI is its redefinition of the value of labour power (vlp). Instead of tying it to a fixed basket of goods (as in the standard interpretation), or defining it as a share of the surplus product or as a real wage (as in Sraffian models), the NI defines vlp in terms of the purchasing power of wages – that is, the portion of the net product that workers can purchase with their earnings. This approach reasserts vlp as a historically determined, socially mediated relation – shaped by class struggle over the distribution of the net product – rather than as a technical input. This allows wages to be analysed as a distributional claim over net output, that is, over the division between SLT and NLT. Increases in the purchasing power of wages raise the value of labour power and, given the $melt$, compress the share of net output available as SV, making the distributive conflict between capital and labour explicit in the macro aggregates.

The methodology centres on calculating the $melt$, defined as the ratio of national income (Y) to aggregate annual hours worked (H), expressed as $melt = \frac{Y}{H}$ (see summary of key variables in Table 1). To refine this and incorporate a UL–PL distinction, superscripts productive (P) and unproductive (U) are used, with self-employed workers included as superscript M. Accordingly, self-employed who are productive are denoted by a superscript MP, and unproductive self-employed by MU. The refined $melt$ for productive workers, denoted as $melt^P$ comprises the net output (Y) divided only by aggregate productive hours ($H^P + H^{MP}$ or $\sum h_i^P n_i^P + \sum h_i^{MP} n_i^{MP}$). In national income terms, Y is resolved into aggregate wages (W), aggregate profits (Π) and aggregate mixed income (M). Empirically, we proxy this expenditure measure of output using factor incomes. We can also disaggregate productive hours in each sector by the average hours per worker (h), multiplied by the number of workers employed in each sector (n). Surplus value for the 'refined model' which incorporates the UL–PL distinction (SV^P) is derived by subtracting the wage components of productive employees and self-employed workers ($w^P \sum h_i^P n_i^P + w^{MP} \sum h_i^{MP} n_i^{MP}$)[1] from ($Y$), divided by the $melt^P$. Alternatively, can be

Table 1. Definition of key variables.

Variable	Unadjusted (no UL–PL)	Data output	Refined (UL–PL)	Data output
s'	$s'^{all} = \frac{\Pi}{W}$	s'_all	$s'^{P} = \frac{\Pi + (w^{U}\sum h_i^{U} n_i^{U} + w^{MU}\sum h_i^{MU} n_i^{MU})}{w^{P}\sum h_i^{P} n_i^{P} + w^{MP}\sum h_i^{MP} n_i^{MP}}$	s'_prod
w	$\frac{W}{H}$	$wage(hr)\_all$	$w^{P,MP} = \frac{w^{P}\sum h_i^{P} n_i^{P} + w^{MP}\sum h_i^{MP} n_i^{MP}}{\sum h_i^{P} n_i^{P} + \sum h_i^{MP} n_i^{MP}}$	$wage(hr)\_prod$
ASV	$ASV^{all} = h_i^{all} - \frac{h_i^{all}}{(s'^{all}+1)}$	ASV_all	$ASV^{P} = h_i^{P} - \frac{h_i^{P}}{(s'^{P}+1)}$	ASV_prod
$melt$	$melt^{all} = \frac{Y}{H}$	$melt\_all$	$melt^{P} = \frac{Y}{\sum h_i^{P} n_i^{P} + \sum h_i^{MP} n_i^{MP}}$	$melt\_prod$
vlp	$\frac{w}{melt}$	vlp_all	$\frac{w^{P,MP}}{melt^{P}}$	vlp_prod
V	W	V_all	$w^{P}\sum h_i^{P} n_i^{P} + w^{MP}\sum h_i^{MP} n_i^{MP}$	V_prod
$\frac{L_{UL}}{L_{PLprv}}$			$\frac{L_{UL}}{L_{PLprv}}$	Lul/pl_prv
$\frac{L_{UL}}{L_{PLmix}}$			$\frac{L_{UL}}{L_{PLmix}}$	Lul/pl_mix
$\frac{W_{UL}}{W_{PL}}$			$\frac{W_{UL}}{W_{PL}}$	Wul/pl

expressed using factor income components, incorporating profits (Π) and wages of UL ($w^{U}\sum b_i^{U} n_i^{U} + w^{MU}\sum b_i^{MU} n_i^{MU}$), which is used for our empirical calculations. Variable capital (V) represents wages of all workers in the unrefined version and wages of PL in the refined version. The rate of surplus value (s') is then calculated as the ratio of surplus value (SV) to variable capital (V) as in Equation 7, with $melt$ and $melt^{P}$ cancelling out for each respective equation. And, for the refined measurement, the value of labour power (vlp) is derived as the average hourly wage for PL ($w^{P,MP}$) divided by the. Here the ratios derived consider the number of workers and average weekly hours each year per employee (derived from the *BHPS* and *Understanding Society*). Within this we calculate the vlp on an hourly basis, which represents an income share.

Ceteris paribus, there are two ways to increase the rate of SV: (1) by extending the length of the working day while the level of NLT remains unchanged (ASV) and (2) by reducing the period of NLT (RSV). In the sphere of production, the latter can be achieved through technological change (the division of labour, cooperation and machinery, that increase productivity), or by labour intensification, thereby reducing NLT, changing the numerator and denominator of s', while the length of the working day remains unchanged. Alternatively, RSV extraction can be achieved in the sphere of distribution through a reduction in wages (as an outcome of class struggle). In empirically examining ASV and RSV, these two processes interact dynamically to determine changes in s'. There is some controversy over the way intensification is treated (see Mavroudeas & Ioannides 2011), but because of the way that national statistics are constructed, it is impractical to distinguish SV increase through labour productivity increase from that caused by labour intensification. The sphere of distribution is also important, as it impacts SV via changes in the balance of class forces (Mavroudeas & Ioannides 2011). In a dynamic production model, the manifestation of these socio-economic factors may also contribute to a reduction in NLT, which we model here as RSV production.

We also proxy the UL–PL ratio in three different ways: (1) $\frac{L_{UL}}{L_{PL_{prv}}}$ for employment in the private sector, (2) $\frac{L_{UL}}{L_{PL_{mix}}}$ for employment in the mixed-income sector and (3) $\frac{W_{UL}}{W_{PL}}$ for the whole unproductive wage expenditure over the productive wage expenditure. Mohun (2014) uses both labour and wage expenditure to examine UL–PL ratio's effects. Rotta (2022) finds that UL expenditure reduces income inequality (here proxied by s'^{all}).

The composition of labour (productive and unproductive) and distributional adjustments in the UK capitalist system are captured by the labour composition function, θ, with φ capturing the potential capital effects. The models are thus represented as follows:

$$s'^{all} = \left(\frac{melt \cdot h}{w}\right) \cdot \theta\left(\frac{L_{UL}}{L_{PL_{prv}}}, \frac{L_{UL}}{L_{PL_{mix}}}, \frac{W_{UL}}{W_{PL}},\right) \cdot \varphi(k) \tag{1a}$$

$$s'^{P} = \left(\frac{melt^{P} \cdot h^{P,MP}}{w^{P,MP}}\right) \cdot \theta\left(\frac{L_{UL}}{L_{PL_{prv}}}, \frac{L_{UL}}{L_{PL_{mix}}}, \frac{W_{UL}}{W_{PL}}\right) \cdot \varphi(k) \tag{1b}$$

Models 1a and 1b incorporate $\varphi(k)$ to account for any potential role played by capital (k), whereas models 2a and 2b do not include $\varphi(k)$:

$$s'^{all} = \left(\frac{melt \cdot h}{w}\right) \cdot \theta\left(\frac{L_{UL}}{L_{PL_{prv}}}, \frac{L_{UL}}{L_{PL_{mix}}}, \frac{W_{UL}}{W_{PL}},\right) \tag{2a}$$

$$s'^{P} = \left(\frac{melt^{P} \cdot h^{P,MP}}{w^{P,MP}}\right) \cdot \theta\left(\frac{L_{UL}}{L_{PL_{prv}}}, \frac{L_{UL}}{L_{PL_{mix}}}, \frac{W_{UL}}{W_{PL}}\right) \tag{2b}$$

In the standard Marxian analysis, s' is driven by labour exploitation intensity, labour productivity, intensification, working day extension and wage reductions, as described above. The first term, $\frac{melt \cdot h}{w}$, captures the core SV rate drivers. This is adjusted by $\theta\left(\frac{L_{UL}}{L_{PL_{prv}}}, \frac{L_{UL}}{L_{PL_{mix}}}, \frac{W_{UL}}{W_{PL}}\right)$, a function that incorporates structural pressures from UL, specifically, the ratios of UL–PL in private and mixed sectors, and the relative wage burden of UL. Together, the model reflects how exploitation in production is shaped not only by wage and hour relations but also by macroeconomic capital–price relations and the broader socio-economic composition of the labour force. The first models (1a and 1b) are also adjusted by $\varphi(k)$, which is a function reflecting gross fixed capital formation (k) reflecting how it affects the reproduction of value and the distributional outcomes.[2] We include (k) in (1a) and (1b) as an additional macro control, treating it as a flow indicator of the pace of accumulation rather than as a measure of the capital stock or the organic composition of capital. Its limited effect on the rate of surplus value in our results suggests that, within our framework, variations in exploitation are driven mainly by labour-side factors (wages, productivity, UL–PL composition, working time) rather than by contemporaneous movements in investment.

Estimating these Marxian variables using UK data presents empirical challenges. Using data from the ONS, specifically the Blue Book, combined with micro-level data from the *BHPS* and *Understanding Society*, enables detailed analysis of wage rates and working hours across different employment types. In our approach, net output is calculated by summing the gross operating surpluses of various company types (using ONS ID indicators): NQNV (i.e. gross operating surplus of financial corporations), NRJT (i.e. gross operating surplus of non-financial public organisations), NRJK (i.e. gross operating surplus of non-financial private corporations), QWLT (i.e. gross mixed income) and HAEA (i.e. compensation of employees). However, pensions are excluded from our calculations. We track changes over time, starting from a base year of 1992, and define SV as inclusive of a profit component from mixed income, which we compute as the residual from the wage component of this mixed income. This methodology uniquely adapts conventional data to permit a Marxian analysis of the UK labour market, offering insights into the effects of different labour types on economic output. Furthermore, by including wages from public sector employees in our calculations of s' we account for

Figure 2. Unproductive employment, ratios over productive employment, working week: (a) Ratios over productive employment. (b) Working week (Productive and Unproductive employment in private, public sector and self-employed).

their economic role from a broader UL–PL perspective. This comprehensive approach ensures a robust analysis of the UK's economic structure and underlying forces.

Alternative measurements: model specification and descriptive analysis

The historical patterns of UL and PL, based on our unique methodology, are outlined in Figure 2(a) and (b). In contrast to the postwar pattern in the United States (e.g. Tsoulfidis & Paitaridis 2019), our analysis suggests a relative fall in UL over the period 1992–2020. The ratio of UL–PL fell by over 19% (2020 index value = 80.29) relative to the 1992 base year (Figure 2(a)). The data suggest a short-run boost to productive employment after the 2008 crisis, largely driven by growth in self-employment, and this coincides with growth in the gig economy, with employees changing to freelancer or partner status (Howcroft & Bergvall-Kåreborn 2019). We can also explore this in terms of the ratio of UL–PL. In Figure 2(a), the bold line plots the pattern in the wage ratio of UL (including public sector labour), relative to PL, indexed, with 1992 as the base year. The unproductive wage ratio rises by 34.2% up to 2009, before falling back by 2020. This suggests that growth in UL up to the 2008 Crisis created an imbalance in the real economy, which led to a relative decline in UL, post-Crisis, with the UL–PL ratio almost reaching 1992 levels by 2020.

We identify 2008 as a potential turning point in the dynamics of UL and PL. Our findings reveal distinct effects of the three UL–PL ratios on productivity, SV and wages (see Figure 3(e) and (f)). While a higher $\frac{W_{UL}}{W_{PL}}$ ratio may have a positive impact on productivity, a higher $\frac{L_{UL}}{L_{PL_{prv}}}$ ratio negatively affects productivity. Conversely, a

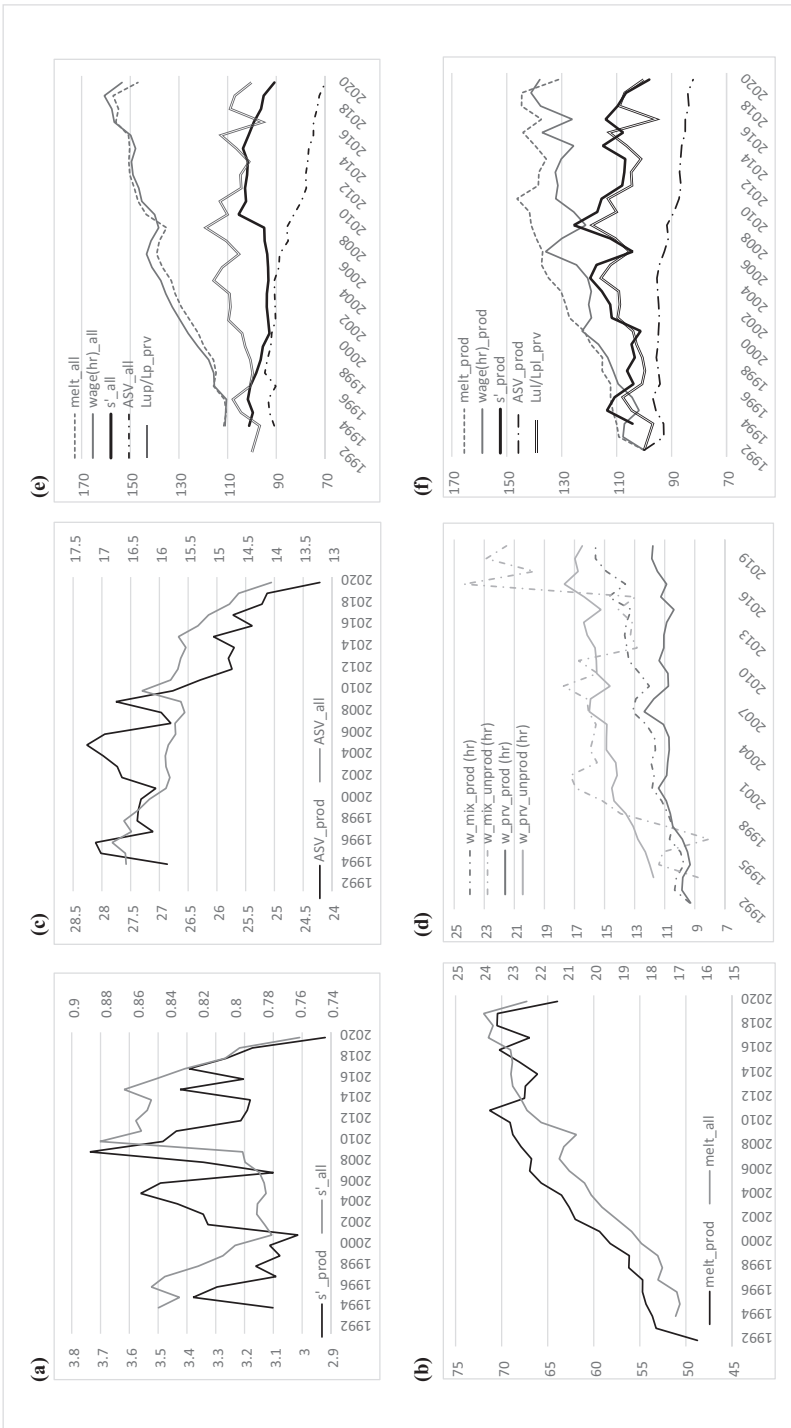

Figure 3. SV rates of surplus value, melt measures, surplus labour time, real hourly wage, rates of surplus value (all labour) and their drivers. (a) Rates of surplus value. (b) *melt* measures. (c) Surplus labour time. (d) Real hourly wage. (e) Rate of surplus value (all labour) and its drivers indexed to 1992. (f) Rate of surplus value (productive labour) and its drivers indexed to 1992.

Table 2. Regression analysis of surplus value extraction. All variables indexed to 1992.

	All labour						Productive labour					
	1992–2020		1992–2007		2008–2020		1992–2020		1992–2007		2008–2020	
SV rate	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Wage (hr)												
2sls-endog	-1.66***	-1.63***	-1.58***	-1.73***	-1.36***	-1.43***	-1.47***	-0.81***	-1.46***	-1.21***	-1.04***	-0.84***
Prais	-1.61***	-1.58***	-1.78***	-1.74***	-1.51***	-1.49***	-1.02***	-1.02***	-1.17**	-1.22*	-1.01***	-0.97***
1st diff.	-1.58***	-1.57***	-1.77***	-1.74***	-1.47***	-1.49***	-0.89***	-0.97***	-0.55**	-0.81***	-0.63*	-0.85***
ASV												
2sls	-0.094**	-0.095*	0.274	0.132***	0.187	0.059	-0.227	0.43*	-0.860	-0.127	0.636	0.394
Prais	-0.029	-0.0003	0.090**	0.123***	0.065	-0.008	0.247	0.22	0.005	-0.152	0.794	0.763
1st diff.	0.011	0.0303	0.059	0.096	0.117	0.087	0.87***	0.67***	1.420**	0.858*	1.475*	1.154*
melt												
2sls	1.62***	1.60***	1.68***	1.78***	1.35***	1.44***	1.31***	0.83***	1.19***	1.25**	0.60***	0.55***
Prais	1.59***	1.58***	1.82***	1.79***	1.49***	1.47***	0.98***	1.01***	1.29**	1.26**	0.58***	0.71***
1st diff.	1.57***	1.56***	1.83***	1.81***	1.46***	1.49***	0.84***	0.80***	1.40**	1.27**	0.72**	0.63**
Capital												
2sls	0.014*		-0.031		0.016		0.112		0.186		0.102**	
Prais	0.012		0.009		0.015		0.033		-0.042		0.090	
1st diff.	0.009		0.012		0.013		-0.075		-0.165*		-0.139	
Lul/pl_prv												
2sls	0.014	0.003	0.070***	0.052***	0.013	0.006	0.241	0.049	0.151	0.093	0.35***	0.180
Prais	0.007	0.009	0.051***	0.058***	0.007	0.029**	0.074	0.036	0.108	0.125	0.31*	0.179
1st diff.	0.008	0.009	0.033***	0.038***	0.008	0.006	0.032	0.111*	-0.256*	-0.176	-0.08	0.145
Lul/pl_mix												
2sls	-0.028**	-0.025*	-0.008	-0.01***	-0.10**	-0.046*	-0.085	-0.077	0.046	0.028	-0.336*	-0.187
Prais	-0.022*	-0.018*	-0.01**	-0.01**	-0.059	-0.081**	-0.083	-0.088	0.025	0.030	-0.386	-0.261
1st diff.	-0.021*	-0.018*	-0.005	-0.005	-0.050	-0.022	0.030	0.020	-0.035	-0.021	0.242	-0.106
Wul/pl												
2sls	-0.023	-0.014	-0.073***	-0.053***	-0.012	0.001	-0.375	0.066	0.105	0.008	-0.122	0.144
Prais	-0.019*	-0.018*	-0.052***	-0.059***	-0.016	0.014	-0.036	0.000	-0.043	-0.015	-0.114	-0.070

(continued)

Table 2. (continued)

	All labour						Productive labour					
	1992–2020		1992–2007		2008–2020		1992–2020		1992–2007		2008–2020	
SV rate	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
1st diff.	-0.020*	-0.020*	-0.027**	-0.032***	-0.020	-0.017	-0.046	-0.075	0.125*	0.120	0.034	-0.060
Intercept												
2sls	114.976***	114.634***	67.25***	83.35***	87.83***	94.36***	152.68***	51.83696	165.351	96.17***	83.8367	76.33
Prais	106.56***	102.265***	87.97***	84.04***	99.40***	102.31***	80.97***	84.49***	84.73**	98.41***	76.33	71.70
1st diff.	0.022	0.031	-0.068	-0.048	0.053	0.072	0.658193	0.58**	-1.195**	-0.883	1.378	0.691
R-square												
2sls	0.9960	0.9954	0.9993	0.9998	0.9989	0.9989	0.9344	0.9603	0.9934	0.9962	0.9723	0.9637
Prais	0.9997	0.9995	1.0000	1.0000	0.9997	1.0000	0.9708	0.9843	0.9997	0.9996	0.9894	0.987
1st diff.	0.9944	0.9944	0.9972	0.9970	0.9978	0.9977	0.9785	0.9763	0.9958	0.9926	0.9642	0.9639
Diagnostic												
2sls												
Durbin (p)	0.265	0.683	0.034	0.073	0.130	0.327	0.164	0.525	0.324	0.527	0.051	0.202
WH (p)	0.181	0.500	0.161	0.210	0.407	0.555	0.250	0.595	0.542	0.675	0.268	0.436
Prais												
rho	0.833	0.912	-0.570	-0.526	0.885	-0.803	0.321	0.521	-0.485	-0.422	0.599	0.901
DW (O)	0.610	0.654	2.667	2.572	1.774	2.131	1.265	1.163	2.292	2.306	1.388	1.851
DW (T)	1.589	1.670	2.361	2.236	0.768	2.325	1.501	1.679	2.246	2.199	1.816	1.793
1st, diff.												
VIF	6.160	6.480	9.790	9.560	19.340	20.170	4.600	3.900	16.670	12.920	12.430	5.310
hettest (p)	0.890	0.328	0.940	0.496	0.682	0.517	0.386	0.572	0.575	0.933	0.935	0.671
hettest-r(p)	2.110	0.917	0.595	0.173	0.635	0.704	0.352	0.688	0.301	0.698	0.609	0.821
ovtest (p)	2.250	0.109	0.354	0.441	0.090	0.183	0.640	0.726	0.163	0.130	0.032	0.823
Obs.	27		14		13		27		14		13	

Note: Significance levels: 10% (*), 5% (**) and 1% (***). Variables in Indices of 100. Estimators include: Ordinary Least Squares (OLS), 2 Stage Least Squares for instrumental variables (2SLS), Prais–Winsten estimation is a procedure meant to take care of the serial correlation of type AR(1) in a linear model (PRAIS) and First Differences.

higher $\frac{W_{UL}}{W_{PL}}$ reduces both SV and wages, whereas a higher $\frac{L_{UL}}{L_{PL_{prv}}}$ increases them (Table 2). These results underscore the importance of distinguishing not only between UL and PL but also between their employment and expenditure ratios when analysing economic performance.

We also explore wage differentials across different labour categories. The hourly wage of PL, w^P (denoted as $w(hr)\_prv\_prod$ from our statistical output in Figure 3(e), is generally the lowest over the study period, with the hourly wage for mixed PL, w^{MP} ($w(hr)\_mix\_prod$ in our statistical output), being slightly higher. These wage differentials widen after 2010, albeit following the same trajectory. By contrast, the hourly wage for UL, w^U ($w(hr)\_prv\_unprod$) in the statistical output), is significantly higher, reflecting the premium associated with supervisory and circulatory roles. Most striking, however, is the trajectory of the average wage within mixed UL w^{MU} (denoted as $w\_mix\_unprod(hr)$ across Figures 3(a)–(f)). After a decade of relative stability between 2000 and 2011, this wage category exhibits considerable volatility, suggesting heightened precarity in the employment and income of this group. This instability may reflect broader economic shifts, such as the increasing casualisation of labour and the growing reliance on gig work in certain sectors.

Econometric regressions: results and discussion

Estimations and results

The s'^{all} and s'^{P} magnitudes are both indexed relative to 1992 and presented in time series, based on Gouverneur's (1983) method. We use descriptive statistics and regression analysis to examine the contribution of the different drivers to SV patterns, and to identify empirical relationships among them. We initially use an ordinary least squares (OLS) regression prior to testing these relationships using three approaches which reduce potential endogeneity bias in the time-series analysis. These are: (1) two-stage least squares with instrumental variables for endogeneity (2SLS), (2) Prais–Winsten (using generalised least squares (GLS)) which ameliorates serial correlation problems in a linear model and (iii) first-difference OLS for unobserved heterogeneity. For our unadjusted and refined model (incorporating the UL–PL distinction), estimators are as follows.

2SLS estimation:

$$\begin{aligned} w^{all}_{endog(t)} &= \pi_0 + \pi_1 X^{all}_t + \pi_7 Z_t + u_t \text{ and } s'^{all}_t \\ &= \beta_0 + \beta_1 w^{all}_{endog(t)} + \beta_2 X^{all}_t + \beta_3 Z_t + \varepsilon_t \end{aligned} \quad \text{(3a \& 3b)}$$

$$\begin{aligned} w^{P}_{endog(t)} &= \pi_0 + \pi_1 X^{P}_t + \pi_7 Z_t + u_t \text{ and } s'^{P}_t \\ &= \beta_0 + \beta_1 w^{P}_{endog(t)} + \beta_2 X^{P}_t + \beta_3 Z_t + \varepsilon_t \end{aligned} \quad \text{(4a \& 4b)}$$

PRAIS estimation:

$$s_t'^{all} - \rho s_{t-1}'^{all} = \beta_0 (1-\rho) + \beta_1 \left(X_t^{all} - \rho X_{t-1}^{all} \right) + \beta_8 \left(Z_t - \rho Z_{(t-1)} \right) + \left(\varepsilon_t - \rho \varepsilon_{t-1} \right) \quad (5)$$

$$s_t'^{P} - \rho s_{t-1}'^{P} = \beta_0 (1-\rho) + \beta_1 \left(X_t^{P} - \rho X_{t-1}^{P} \right) + \beta_8 \left(Z_t - \rho Z_{(t-1)} \right) + \left(\varepsilon_t - \rho \varepsilon_{t-1} \right) \quad (6)$$

First differences estimation:

$$\Delta s_t'^{all} = \beta_0 + \beta_1 \Delta X_t^{all} + \beta_8 \Delta Z_t + \Delta \varepsilon_t \text{ where } \Delta X_t = X_t - X_{t-1} \quad (7)$$

$$\Delta s_t'^{P} = \beta_0 + \beta_1 \Delta X_t^{P} + \beta_8 \Delta Z_t + \Delta \varepsilon_t \text{ where } \Delta X_t = X_t - X_{t-1} \quad (8)$$

X_t are the independent variables, which vary by classification (unadjusted and refined) which can be either X_t^{all}, where we assume all labour is productive, or X_t^{P}, where some labour is productive, according to our EPLCS (Z_t includes the set of variables that do not vary according to the grouping in Supplemental Appendix 2). In our analyses, wages are found to be endogenous in a 2SLS regression analysis with s' as the dependent variable due to bidirectional causality, simultaneity and interactions with other independent variables. Bidirectional causality arises because wages influence SV (higher wages reduce SV) and SV influences wages (higher SV may lead to wage adjustments). Simultaneity occurs because wages and SV are jointly determined within the economic system, with firms setting wages based on expected SV, while SV depends on wages paid. In addition, wages interact with other variables like ASV, productivity, capital, price inflation and the ratio of UL–PL. For example, ASV (linked to working hours) can affect wages through overtime pay, while productivity gains may increase SV, but not proportionally raise wages. Capital intensity and inflation further influence both wages and SV, together with the ratio of UL–PL, impacting wage structures and SV extraction, reflecting socio-economic interdependencies.

The regression analyses are summarised for the unadjusted SV rate for all industries (s'^{all}) and for productive industries (s'^{P}) in Table 2, with a supplementary graphical representation provided in Supplemental Appendix 3, and additional results using the *melt* and *wages(hr)* as the dependent in Supplemental Appendices 4 and 5, respectively. The findings summarised in Table 2 are significant because they reveal key differences between the unadjusted (s'^{all}) and refined SV rates (s'^{P}), highlighting the importance of distinguishing between PL and UL. The periods during which both rates rise (2009–2011) implies that: (1) profits grow quicker than wages and (2) profits and unproductive wages grow quicker than productive wages. As productivity is already stagnant during these years, this may indicate weaker labour bargaining power, or cost-cutting measures, showing the role that non–production-related factors play in SV dynamics. It also reflects a shift in economic activity towards sectors that do not contribute directly to SV

creation, such as services or finance. Productive sectors see stagnant or slower wage growth, which may be a short-run phenomenon reflecting a myopic capitalism reliant on downward wage pressure and austerity.

The reverse happens in the periods when respective SV rates drop (e.g. 1992–2001 and 2011–2020). This can happen during periods of stronger labour bargaining power, redistributive policies or economic downturns where firms face pressure to raise wages or reduce profit margins. Workers may gain relative leverage to demand higher wages, or firms may struggle to maintain profit relative to wages, leading to a smaller share of net output captured as SV. Between 2001 and 2009, s'^{all} and s'^{P} decoupled, showing that while profits grew modestly relative to wages, profits plus unproductive expenditure surged relative to productive wages, reflecting stagnant productive wages and rising public sector wages. The decoupling can result from structural changes in the economy, such as the decline of manufacturing and the rise of service-oriented or public sectors. The fact that the drop in s'^{P} is manifest first, followed by the reduction in productivity from 2010, supports the thesis that crises are crises of profits. And, because this is evident in productive industries, rather than the whole economy, this reinforces the view that capitalist crises of production are an enduring phenomenon, rather than being driven by circulation or distribution (e.g. finance).

Longer shifts and stagnant surplus value: the contradiction of extended working hours

The United Kingdom has relied more heavily on lengthening the working day (Papagiannaki et al. 2021), referred to as ASV extraction, compared with its European Union (EU) counterparts (Rubery et al. 2022). During the Conservative Government in the early to mid-1990s, working hours increased, but this trend reversed under the Labour Government post-1997 (Felstead & Green 2017), influenced by progressive policies like the adoption of the EU Working Time Directive through the Working Time Regulations. These measures reduced working hours, highlighting the role of policy in shaping labour practices. However, our results show that the pattern of ASV diverged before and after the 2008 crisis, with a notable increase in working hours during the 2020 pandemic, particularly in unproductive, deregulated sectors characterised by precarious employment (see Figure 2(b)).

However, despite the reliance on extending the working day, consistently positive results are mainly detected towards the adjusted-for-PL SV rate s'^{P} (see Table 2). Even with the permanence of unpaid overtime in UK industry (Chung & van der Horst 2020), workers may spread their effort over longer hours rather than increasing daily productivity, particularly in the unproductive sectors. This suggests that ASV extraction, especially in the productive sectors, is common. For productive industries, lengthening the working day has a strong positive effect on the refined surplus value rate s'^{P}, especially post-2008, as firms seek to extract more SV through extended hours. Yet, the decline in s'^{P} after 2008, partly due to reduced ASV, indicates that working time regulations have constrained this practice, with the 5-day working week enduring as a norm.

The reliance on ASV reflects a response to stagnant labour productivity, but its effectiveness is limited in the unproductive industries. Workers in productive industries

struggle to sustain high productivity over extended periods and, as hours fell post-2008, a crisis in SV production emerges. This betrays the limits of ASV extraction and the structural challenges from relying on longer working hours to raise surplus value and sustain accumulation. Together, the findings highlight the tension between labour exploitation, worker resistance and the role of policy in shaping outcomes.

UL and longer shifts: The UK's productivity puzzle?

In our analysis, labour productivity growth appears to stagnate in the post-crisis years. From Table 2, there seems to be a strong and statistically significant positive contribution of labour productivity towards s'^{all} and s'^{P}, and this pattern is consistently present across the 2SLS, Prais–Winsten and first-difference models, for both indicators. This reflects the different levels of priority given to RSV by each government. The $melt^{P}$ stagnates after 2008, in comparison to $melt^{all}$ (Figure 3(b)), indicating the existence of a UK productivity puzzle, impacting the productive sector. The period of $melt^{P}$ stagnation corresponds to the beginning of the puzzle as identified by ONS (2015) and Goodridge et al. (2018). Productivity problems have been especially pronounced in the manufacturing sector (Fernández & Palazuelos 2018). Smith (2020) observes that manufacturing occupations that produce value and profit can easily be automated, but this is less so in services, particularly with a growing proportion of labour devoted to unproductive supervisory or circulatory activities. Therefore, with the United Kingdom increasingly dominated by such activities, one would not expect productivity to grow markedly. This is evidenced as we detect a negative relationship of $Lul\,/\,pl\_prv$ towards $melt^{P}$ (Figure 3(f) and Supplemental Appendix 4). In fact, labour in unproductive activities, and the extension of the working day in productive industries, have been the strongest negative predictors of productivity, especially since 2008.

It is worth noting that productivity increase can mask intensification, therefore what appears as increased labour productivity might actually be increased workload. Evidence from other studies (e.g. Green 2004, 2006; Felstead & Green 2017) shows that labour intensification has been significant in the UK economy, and labour productivity growth might be even smaller, historically, than previously thought.

'Sticky' productive wages, surplus value and the sphere of distribution

As expected, the real hourly wage shows a strong negative relationship with both s'^{P} and, to a greater extent, s'^{all} (Table 2). Since s' fell after 2008 wages did not adjust downward in the same proportion, reflecting limits set within the sphere of distribution and norms of a historically acceptable standard of living. This is especially true for PL's wages that cannot fall substantially because of the more inflexible nature of the roles.

Mainstream economists have overwhelmingly attributed wage changes to changes in labour productivity, yet our findings show that distributional dynamics are decisive. For the economy as a whole, the real hourly wage tracks the $melt$ almost linearly (Figure 3(e)), contrary to $melt^{P}$ (Figure 3(f)), which measures the value created per hour in

productive industries, before its distribution: productive workers' wages are only one claim among many on that value, alongside unproductive wages, commercial and financial margins, and rents. Generally, for all three decades, the real wage is negatively affected by the movements of s'^{all} and s'^{P}, demonstrating the effect of distribution on wage determination, that is, a larger share of net output appropriated as surplus value leaves a smaller share for wages. Following Marx and Marxist political economy, wage determination is treated as relatively autonomous from the immediate technical conditions of production, as it is shaped primarily in the sphere of distribution through class struggle and institutional arrangements. The value of labour power in Marx has a physical, historical and moral element determined by social norms and class struggle over the standard of necessity (e.g. Capital Vol. I, ch. 6, 19, 25; and in Value, Price and Profit in Marx (2010 [1865]), in MECW, Vol. 20). Subsequently, the value of labour power is a historically and morally determined category, not a purely technical cost (Marx 1976 [1867], 2005; Fine & Saad-Filho 2004; Laibman 1992; Lebowitz 2010; Mavroudeas & Ioannides 2011; Cipolla 2018). In our analysis, this negative relationship is stronger, particularly in the years after 2008, showing that the stagnation of wages in the United Kingdom was indeed attributed to the extraction of *SV*. In the productive industry models, we see the significant positive contribution of Lul/pl_prv, but a negative one of Wul/pl to wages. These effects are further analysed below.

The UL productivity drain

The United Kingdom's surplus value dynamics are shaped by the tension between UL and PL. Focus on UL-intensive sectors (e.g. finance, real estate) diverts surplus value, s'^{P}, away from productive reinvestment, resulting in a negative relationship between financialisation and productive capital accumulation. This aligns with a Marxian view that, while commercial capital operates autonomously, its movements ultimately mirror industrial capital's logic, even as financialisation distorts this link. Unlike the United States, where Rotta (2022) found UL expenditure reduces income inequality (proxied by s'^{all}), the United Kingdom exhibits no such effect. Indeed, the United Kingdom's reliance on sectors which are UL-intensive, particularly pre-2008, shows that increases in UL relative to PL in the private sector were associated with a higher rate of SV. This reinforces the narrative where expanding layers of managerial, administrative and financial (unproductive) labour facilitated stronger control and intensified extraction from PL. The negative contribution of UL in mixed sectors (Lul/pl_mix) towards surplus value extraction (s'^{all}) for 1992–2007 potentially reflects inefficiencies or distributional tensions where UL, particularly outside purely private sectors, consumed surplus without sufficiently enhancing control or exploitation of productive workers.

Conclusion

This study has examined the changing configuration of PL and UL, surplus value and income distribution in UK capitalism, through development and application of a novel framework. The patterns documented are not mere macroeconomic movements, but they reflect how UK capitalism has evolved since the 1980s, based on surplus value extraction

and the organisation of labour. The novelty is not the conceptual distinction between UL and PL, but the development of a UK-specific empirical system (i.e. EPLCS) for implementing based on the NI and 'income-based data', in contrast to IO matrices as per Cockshott et al. (1995). By combining ownership, industry circuit-position and occupation into the EPLCS, we identify UL and PL at a granular level not previously conducted for the United Kingdom. Integrating this classification with the NI allows us, for the first time, to provide a long-run UK series in which changes in UL–PL composition, surplus value, the *melt* (proxying productivity) and working hours can be analysed jointly. By using official UK economic data (Blue Book), alongside longitudinal household surveys (*Understanding Society* and the *BHPS*), we track how shifting industry and occupational patterns have shaped SV extraction and productivity over three decades. The methodological contribution therefore lies both in translating Mohun and Shaikh and Tonak's insights into a UK data architecture, and in integrating this classification with NI to produce an account of the structural transformation of UK capitalism. Our findings reveal several critical developments in the United Kingdom's socio-economic structure.

First, the research identifies a significant decline in the productive sector's rate of surplus value (s'^{P}) between 2006 and -2007, preceding the 2008 financial crisis. This suggests that the United Kingdom's economic vulnerabilities originated in, or were exacerbated by, production sectors, rather than solely originating in financial markets. The subsequent productivity stagnation, particularly pronounced after 2011, is strongly suggestive of structural weaknesses in the United Kingdom's economic base that persist on an ongoing basis.

Second, the findings show that the process of surplus value extraction in the United Kingdom has undergone distinct phases. During the 1990s, extended working hours drove surplus value, particularly under Conservative governments. The Labour administration (1997–2010) arrested this trend, for example, through application of working time regulations and flexible working rights, with SV extraction increasingly maintained through productivity gains rather than longer hours. Following the 2008 crisis, wage suppression and employer-oriented labour market flexibility became dominant strategies, accelerated by Conservative policies, including the 2016 Trade Union Act.

Third, our analysis reveals persistent challenges in the UK's productivity performance. The so-called productivity puzzle appears particularly acute in service sectors, where automation was more difficult relative to manufacturing, a trend that may be reversed in the years since the pandemic with the advances in artificial intelligence. Meanwhile the growth of gig economy work, and self-employment, has created a class of workers who contribute to productive output, but who often lack traditional employment protections and stable incomes resulting in considerable risks around labour exploitation and further challenges in empirical measurement.

Fourth, the study finds that wage growth has become decoupled from productivity gains, with real wages stagnating since 2007, despite periods of rising surplus value extraction. Without distinguishing UL and PL, labour productivity rose steadily until 2008 and then stagnated, and real hourly wages broadly followed this turning point. Taken in isolation, this could be read as supporting the mainstream 'high productivity–high wages' story. However, throughout the entire period investigated real wages in productive industries and occupations remained consistently below productivity, so excess

value produced was to be appropriated by the capital class and the unproductive workers. What looks like a productivity–wage link at the macro level is in fact a typical capitalist distributional process in which productivity growth feeds surplus value more than wages. The findings also indicate that different political approaches to economic management have produced varying outcomes, with Labour governments tending to facilitate RSV strategies, whereas Conservative policy facilitates ASV and immiseration.

Taken together, these trends point to an evolving UK economic model that has become increasingly dependent on financial activities and employer-oriented labour market flexibility to sustain surplus value extraction, often at the expense of productive investment and wage growth. Our analysis shows how the trend towards UL weakens and loses significance after 2008, suggesting a shift in the structural dynamics of SV extraction after the financial crisis. The emphasis moves towards direct labour-cost suppression (wages) and monetary extraction intensification (*melt*), rather than relying on shifting labour composition between UL and PL.

This study is subject to limitations including challenges in empirically measuring SV using UK data reflected in the development of the EPLCS proposed in this article. First, despite following Marx's analytical ordering in which the rate of surplus value and the organisation of labour are primary, and the rate of profit is a derived magnitude that combines exploitation with the technical and value composition of capital, we do not construct IO tables. That, as a complementary analysis, would have given us more information about the UK rate of profit, organic composition of capital and accumulation in toto. Second, the EPLCS inevitably rests on approximations: ownership, 2-digit SIC industry and SOC occupation are used as proxies for positions in the circuit of capital, and some sectors (e.g. transport, utilities, mixed service industries) combine valorisation and circulation functions that we cannot more cleanly separate with UK data. In addition, further research is needed which considers the period since the pandemic as additional data becomes available that provide a period for analysis that will enable useful insights to be drawn, including assessing impacts of emerging digital technologies. Taken together, these choices mean that the article should be read as a principled, transparent account of changes in surplus value extraction and labour composition in UK capitalism, not as a complete empirical reconstruction of all Marxian categories. Notwithstanding these limitations, this article has provided substantial novel contributions in developing and applying a new system for measuring SV that can be applied beyond the UK in contexts where data are similarly limited, and in providing novel insights into the dynamics of the UK economy, including SV distribution and the productivity puzzle.

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Supplemental material

Supplemental material for this article is available online.

Notes

1. The hourly wage rate of productive employees (w^P) by aggregate hours worked ($\sum h_i^P n_i^P$) and the hourly wage component of mixed income (w^{MP}) by the aggregate hours worked by the self-employed ($\sum h_i^{MP} n_i^{MP}$).
2. From a Marxian standpoint, the model's k influencing s′ can be read not as a causal reversal (as normally s′ is used to extended reproduction and capital accumulation), but as a dialectical feedback loop within capital's reproduction schema. By positing k as a driver of exploitation dynamics, the model captures the expansionary pressures inherent to accumulation: rising k intensifies demands on labour (via productivity mandates, technological displacement, or wage repression), thereby structurally mediating s′. This feedback, however, must be contextualised within the broader totality of reproduction where surplus value remains the foundational condition for accumulation.

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