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RECENT NEOCLASSICAL CONTRIBUTIONS ON THE ORIGINS OF INEQUALITY: A SRAFFIAN CRITIQUE

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Abstract

Piero Sraffa, Pierangelo Garegnani, and Luigi Pasinetti undermined the analytical foundations of marginalist price and distribution theories and recovered the surplus approach proper to classical economists. This paper studies the comparative usefulness of, respectively, the marginalist and the modern surplus approaches for the interpretation of pre-capitalistic economies and for the theory of institutions, also in the light of Polanyi's contribution. With this in mind, the paper examines some recent mainstream contributions concerning the origin of inequality and related institutions. Challenging, they adopt materialist explanations of the origin of inequality and institutions drawn from archaeological studies. On the critical side, these studies reject with poor arguments the classical surplus approach. Moreover, they employ marginalist concepts, in particular the relative scarcity of production factors, to explain the onset of inequality. Those concepts are of a spurious nature, especially once applied to ancient economies. In this respect, the paper refers both to Marx's and Polanyi's emphasis on the role of 'embedded' rather than market relations in ancient societies, and to Sraffa's criticism of 'marginism' (scarce historical realism) to the marginalist curves related to production (Rosselli and Trabucchi 2019).

Keywords: Origins of inequality, Surplus approach, Marginalism, Samuel Bowles, Sraffa's Marginism

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Introduction*

In the *pars destruens* of their work Piero Sraffa, Pierangelo Garegnani, and Luigi Pasinetti undermined the analytical foundations of marginalist price and distribution theories while, in the *pars construens*, they recovered the surplus approach proper to classical economists and Marx.¹ While their work was mainly addressed to fully-fledged capitalistic economies, this paper assesses the comparative usefulness of, respectively, the marginalist and the surplus approaches for the interpretation of pre-capitalistic economies and for the theory of institutions, also in the light of Polanyi’s contribution.

While interesting *per se*, the study of the nature and mechanisms of change of past economic formations has also important policy implications. We mention here two. The first concerns the existence of different forms of human economic and social organization in history: are they different in kind or degree? In other words, are markets the natural, ultimate form of organization, and is economic history striving towards them, as basically held by mainstream economists, or just one among other societal arrangements of human affairs? Relatedly, the second implication

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¹ For a comparison between the contributions by, respectively, Pasinetti and Garegnani see Bellino (2015). Recent reviews of the classical approach are Bellino (2022) and Aspromourgos (2024).

regards the origin and evolution of inequality and associated institutions. Marx was very keen on both issues, and this explains his and Engels late deep interest in economic anthropology. We shall mainly be concerned here with the second topic (on the first see Graeber and Wengrow 2021).

In section 1 the paper briefly compares three approaches to the precapitalist economic formations, the classical surplus approach, marginalism (including New Institutional Economics), and Polanyian. The remaining sections discuss some mainstream contributions under the profiles of the appropriateness of the marginalist tools and of their rejection of surplus theory. While mainly concerned with recent contributions, section 2 begins with a classic paper by Evsey Domar (1970), who anticipated the strategy of the more recent papers of picking up a hypothesis from the (non-economic) literature, in his case concerning the late introduction of serfdom in Eastern Europe, revisiting it by marginalist tools, and possibly testing it. With this strategy in mind, Bogaard, Fochesato, and Bowles (2019) revisit the role of the adoption of ox-drawn plough in the early insurgence of inequality (section 3); Mayshar, Moav, and Pascali (2022) do the same re-examining the role of cereals storage (section 4), and Allen, Bertazzini, and Heldring (2023) regarding the time-honoured hydraulic hypothesis (section 5). The conclusions contend that while the reference by these works to material hypothesis is appreciable,² their confinement within a marginalist scheme is superfluous, if not misleading; it is also maintained that their rejection of the surplus approach is poorly motivated. Referring to Garegnani (2018) and Pasinetti (1977) it is finally underlined the relative fruitfulness of the surplus approach vis-à-vis marginalism particularly for its openness to historical and institutional research.

1. Three competing approaches. Or two?

Well before Marx, classical economics was also concerned with economic evolution and the onset of inequality (Meek 1976). Since its early exponents, classical economists thought in terms of stages of development characterised by different and evolving methods of organizing the material reproduction of societies (Pasinetti 1977; Bellino and Brondino 2024). The emergence of a social surplus out of which a part of the population could live dedicating itself to ‘superior’ activities such as politics, art, science, and war was seen as the premise of ‘civilization’ (the inverted commas are of course necessary). Marx’s historical materialism completed this approach by including

² By ‘material’ we mean related to the concrete conditions of production (technical, geographical, demographic etc).

institutions and ideology as functional to the working of the system.³ In the 1930s and 1940s the influential Australian archaeologist Vere Gordon Childe (1892-1957) explicitly relied on Marx to frame his work of systematization of the available knowledge on earlier civilizations. Although the history of archaeology does not begin (or end) with Gordon Childe (Trigger 2007), no doubt that the Australian Archaeologist was one of the most powerful ‘influencers’ of our way of thinking the transition from pre-history to ‘civilization’ (e.g. Childe 1936, 1942, 1950).⁴

Severely simplifying, Childe coined the two terms of ‘neolithic revolution’ and ‘urban revolution’ that still inspire our view of the events, although the term ‘revolution’ has later been contested given that both took millennia to complete. The neolithic revolution marks the long and gradual transition from the human condition of hunter-gatherers (HG) to agriculture – that begun around eight thousand years BCE in specific regions – while the urban revolution indicates the later birth of a more complex town-centred civilisations (often state-towns). The possibility of producing a social surplus, that is a net product above the reproduction requirements,⁵ is seen as the key novelty brought about the adoption of agriculture and animal husbandry. While the existence of a social surplus would in fact relieve part of the population from producing its subsistence, *ça va sans dire* that this process is associated with the insurgence of social stratification in contrast with the more egalitarian tendencies of HG and early agriculturalists. This conventional tale has been object of a multitude of qualifications.

To begin with, HG populations are more puzzling in term of social organization than the good savage Jean-Jacques Rousseau’s myth would like. Given the possibility, in principle, to produce a

³ On the problems of historical materialism see Cesaratto (2025b)

⁴ Childe rivals Lewis Binford (1931-2011) as the most influential archaeologist of the last century (Kelly 2014). On the basis of his impressive capacity of synthesis of the available knowledge, Childe provided the first grand narrative of prehistory (he sadly committed suicide in 1957). Both Childe and Binford ‘took a materialist perspective’ (ibid p. 67), the former of a Marxist orientation, the second inspiring in the late 1950s so-called processual archaeology which relied on material circumstances (say climatic or geographical) to explain social evolution (Costello 2016). Processual archaeology has therefore been seen as not conflicting with Marxist archaeology (e.g. Trigger 1993, p. 186).

⁵ Reproduction requirements include the replacement or maintenance of production inputs consumed in production, and workers’ necessities (including subsistence goods for their families). A popular (non-Marxist) account of the neolithic revolution, using the concept of social surplus, is Diamond (2005 [1997]). On the variety of usage of the term surplus see Cesaratto 2024c; Privitera 2014, p. 442). The term social reproduction has been enriched by gender and race analysis by Picchio (1992) and Federici (2001).

surplus (e.g. by working longer), why they didn't In this regard, was their egalitarianism 'natural', or instead deliberately chosen and preserved is an open question (also in view of possible dominance tendencies due to a genetic background, e.g. sexual instinct, see Wisman 2023). After Marshall Sahlins's (1972) seminal contribution, their quality of life (e.g. their rich diet) has also been revalued especially vis-à-vis that, much poorer, of the early agriculturalists. External causes like climatic change, or endogenous as an excessive pressure on natural resources, are then evoked as causes of the abandonment of the 'heaven of earth' (e.g. Tisdell and Svizzero 2024 for a good review on a number of economic issues in prehistorical archaeology).

From a more methodological point of view, Karl Polanyi (1957) moved a severe critique to a mechanical adoption of the surplus scheme pointing out that the historical and institutional mechanisms that led potential surpluses being mobilised and exploited by an élite must be specified (Pearson 1957).⁶ While apparently rejecting the surplus approach, Karl Polanyi (1957, 1977) gave new lymph to the idea of the existence of a variety of forms of organising the human subsistence. In this respect, former works regarded Polanyi's contribution as an enrichment of the surplus approach underlining the constructive side of his criticism to the concept of social surplus (Cesaratto and Di Bucchianico 2021a/b; Cesaratto 2024c). This is much in line with the importance

⁶ Harris (1959, p. 194 and passim) retorted to Pearson (1957) that rather than the question of who comes first, the surplus or the associated institutional change, is the correlation which is relevant. To another Polanyian who argued that institutional analysis must come first (Rotstein 1961, p. 562), Harris (1961, p. 563) sarcastically replied that 'it remains "whimsical" and "capricious" to suppose that these institutions developed whenever a people thought it would be nice to "institute" them'. In a paper preliminary read by Polanyi, George Dalton (1960, p.483 and passim) criticised the notion of surplus as the 'inducer', the *deus ex machina*, of institutional change. 'What causes surpluses?', he later asked (Dalton 1963, p. 391). George Dalton (1960, pp.486), also dismissed the concept of surplus-based exploitation arguing that the presumed exploiters, priest or politicians, are somehow functional to a consensual community that they duly serve. This corresponds to taking such consent as absence of exploitation merely relying on the subjects' point of view. Earlier, Harris (1959, p. 188) had labelled this as 'cultural relativism'. In the first textbook in economic anthropology, much influenced by Thorstein Veblen, Melville Herskovits (1952 [1940]) argued instead that the elite's conspicuous consumption, based on the mobilization and control of an economic surplus, was functional to arouse admiration and consensus (famously, the manual triggered the wrath of marginalist champion Frank Knight, 1941). For Liverani (1976) the functionality of symbolic social figures to the cohesion of society confirms rather than denying the existence of exploitation.

that both Sraffa and Garegnani assigned to historical and institutional analyses (cf. Ginzburg 2016).⁷

Marginal economics has not however been inactive on those topics. While antecedents can be found in the early days of marginalism, around the 1960s fierce battles were fought between neoclassical economic anthropologists (named by Polanyi 'formalist') and Polanyian scholars ('substantialists'), the former looking at the difference between precapitalist and capitalist economies as of degree, and the latter as in kind.⁸ A large part of this debate concerned whether the marginalist conceptual category of economizing, the rational allocative choice of scarce means to alternative ends to maximise individual utility (welfare or happiness), should be employed in the study of primitive societies, or whether other principles and values should apply, for instance forms of altruism and reciprocity.⁹ From our point of view, this Polanyian line of attack to the 'imperialist implications' of marginalism is unconvincing. Some economic calculation existed, to begin with, also in primitive societies – although not of the kind described by the marginalist functions. Formalists had also easy life to defend their rational choice approach outside a strict economic or market realm, as applicable also to contexts where it is power, prestige or else to be maximised, while altruism or reciprocity could also be interpreted in mere instrumental terms (LeClair 1968, p. 191; North 1977). True, the technicity of the rational choices approach vis-à-vis the complexity and diversity of human societies, requiring more 'substantial' analyses, made Polanyi's criticism attractive to generations of social students. It is however a pity that, deprived of

⁷ One main criticism we moved to Polanyi is his identification of "economics" with marginalism (Cesaratto and Di Bucchianico 2021a/b). Polanyi found marginalism adequate only for capitalism and not for preceding economic formations. Yet, after Keynes and Sraffa marginalism is inadequate also for capitalism. Moreover, deprived of an alternative to marginalism, in fact having dismissed the alternative surplus approach, Polanyi and his student Moses Finley (the celebrated Cambridge, UK, historian) were led to underrate the role of economic analysis of ancient economies. We hold that the surplus approach is such an alternative, in fact applicable to both market and non-market economies. On some difference between Polanyi and Finley on the role of economic analysis for the study of ancient societies see Viglietti (2023).

⁸ A parallel controversy took place among economic historians. The respective labels were of 'modernists' and 'primitivists'. Mosley Finlay inspired primitivism.

⁹ LeClair and Schneider (1968) includes the seminal contributions to the controversy, (see also Dalton 1961). For LeClair and Schneider (1968, p. 10) Polanyi is a reincarnation of the early dismissal of the importance of economics in anthropology by Bronisław Malinowsky. A recent contribution in the tradition that goes from Malinowsky and Marcel Mauss to Karl Polanyi is Cedrini et al. (2019).

the surplus approach, Polanyi's lesson appears enervated, lacking an economic soul, a deficiency that it is however possible to amend.¹⁰

From the 1970s New Institutional Economics (NIE) has tried in various directions, albeit unpersuasively (Ogilvie and Carus 2014, Cesaratto 2024b), to justify the existence of a variety of institutional forms in human evolution – never losing the idea of the market as the ultimate form. Distancing itself from a certain vagueness of NIE, more recent work conducted in the marginalist camp seems to tie itself to findings drawn from archaeological research, reinterpreting them in a marginalist key. In a sense this is a reappearance of the old *formalist* approach, albeit the emphasis is not on *homo economicus* (or rational calculation) but rather on the marginalist analysis of income distribution based on the relative scarcity of 'production factors'. Notably, *their explicit adversary is not Polanyi's substantivism but the classical surplus approach*. In truth the latter had played a relative marginal role in the formalists/substantialists controversy, having been rejected both by the Polanyians and, of course, by the formalists – the latter with a brilliant absence of arguments.¹¹

These studies also test the archaeological findings and hypotheses on data bases that homogenize a large number of cases. The assessment of this method vis-à-vis the more circumstantiated traditional methods of ancient studies, is left to the scholars of this discipline. More competent we feel in comparing the relative advantages of the marginalist and surplus approaches in formulating the appropriate analytical framework.

Figure 1 summarizes the main relations between the three approaches introduced in this section.

¹⁰ The debate between formalists and substantivists on the nature of (more or less rational) choices concerned more anthropology, whose studies focus on observable or documented socio-economic behaviour, than archaeology. The latter is by necessity more attentive to detect the social texture behind material remains. In this way archaeology is, willy-nilly, charmed by Marxism. This is due, Childe (p. 93) contended, to the Marxist 'emphasis on society rather than the individual, whom (...) archaeology alone can hardly reach, and on productive equipment, which bulks so largely in the archaeological record'. Marxism, he concluded, 'is an instrument peculiarly fitted to convert assemblages of monuments and relics into historical data', where 'monuments' evoke the ideological superstructure while 'relics' of production equipment remind of the material structure.

¹¹ Marginalist economists have traditionally confined themselves to outrageous or generic criticism of the concept of surplus. For instance, Frank Knight's (1941, p. 258) labelled it as 'treacherous', while LeClair and Schneider (1968, pp. 469- 470) dismissed Childe, Herskovits and the concept of surplus in a couple of pages, where the latter is defined, on the basis of generic or inappropriate arguments, 'an analytical dead end' (ibid, p. 469).

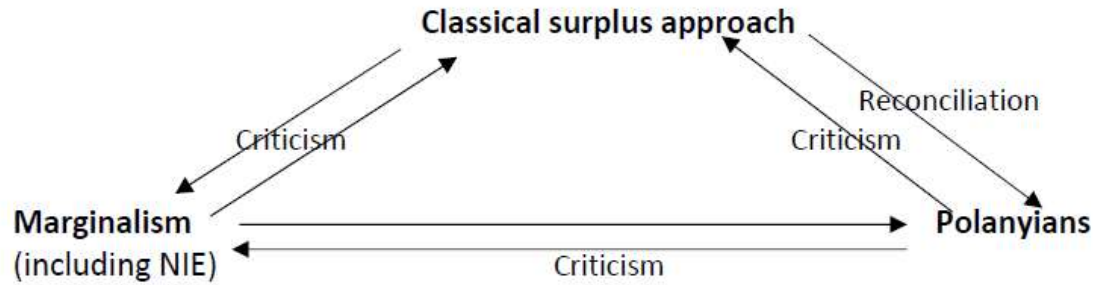


Figure 1

2. Domar on serfdom between institutions and marginalism

The historical background

More or less at the time serfdom was disappearing in Western Europe, it materialized in Eastern Europe. The tale narrated by the Russian historian Vasily Osipovich Klyuchevsky (1841-1911) that Domar (1970, pp. 18-19) picked up can be simplified as follows. Around the second half of the XVth century Russia was engaged in long wars and the central authority implemented a land distribution to the 'servitors'. Free peasants residing in those lands had thus to work partially for their own subsistence and part for the landlord, the newly appointed proprietor of land. The disadvantageous contractual conditions and debts with the landlords encouraged peasants to emigrate to the free lands in the newly conquered territories. Labour scarcity (and land abundance) thus led the government to restrict the freedom of peasants to move, so by the middle of the XVIIth century they were enserfed permitting their exploitation by the appointed landowners.¹²

Domar's model

Domar (ibid, p. 19 and ff) re-exposes this story assuming an economy with two production factors, labour (L) and land (T), of homogenous quality (negligible capital tools are required to produce). At the beginning land is overabundant and free, so that no rent can be claimed on it. In marginalist terms, in this economy the marginal and average products of labour resulting from the application of successive doses of labour to land are constant until all labour is employed, since land is still

¹² Carneiro (1970) underlined the role of the geographical surroundings of a given region (free and hospitable versus politically or materially hostile) in the onset of exploitation.

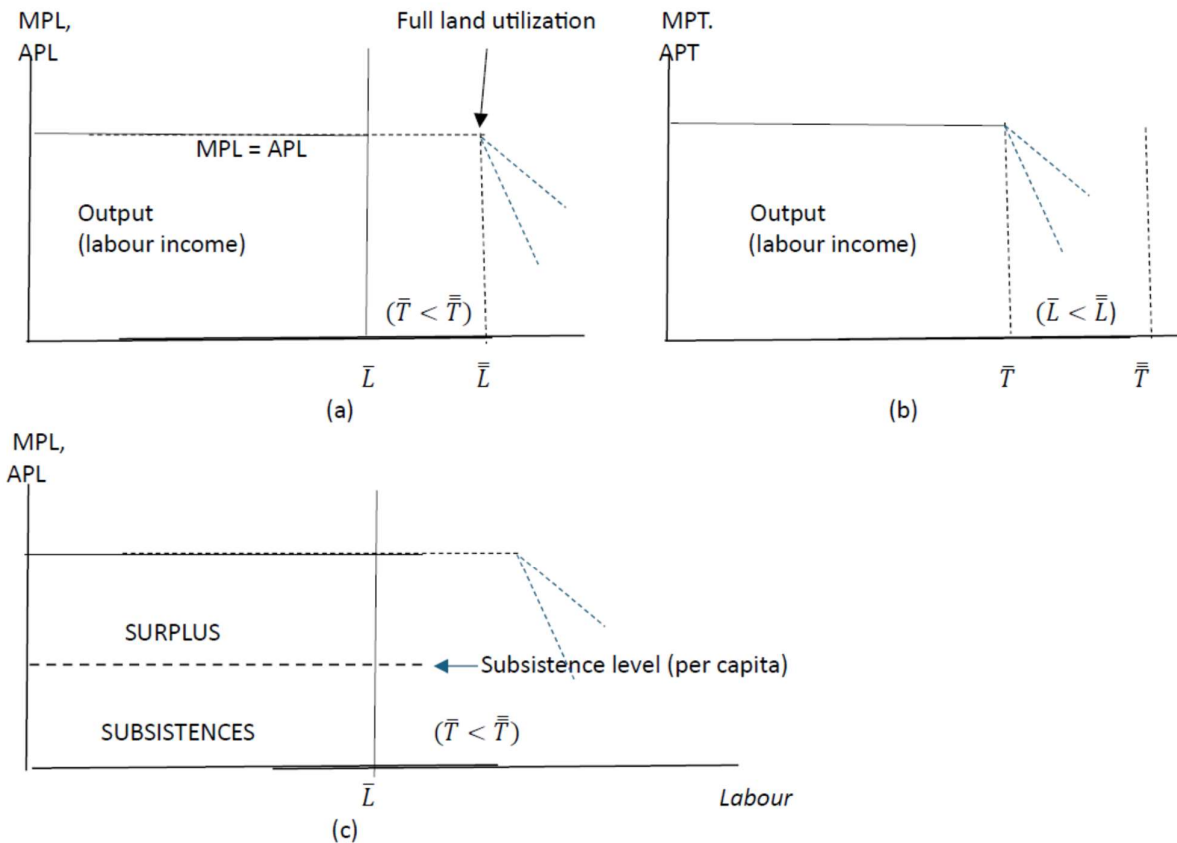
overabundant (figure 2a).¹³ In this equilibrium rent is therefore zero and labour appropriates all product (figure 2b).

In this set up, independent household production (or forms of communal production) would be dominant, since no hired labour would be available if paid less than that it would obtain by creating its own or cooperative farm on the available zero-rent land. In this set up, therefore, no 'surplus' would be left to the hirer.¹⁴ Domar's focus is however on labour and land, so let us retain the assumption that capital has a negligible role. Unless land becomes scarce, landlords cannot extract a surplus from peasants to support themselves and the Muscovite wars. One exit is for the central government to tax households transferring the revenues to the landlords. This might be complicated to manage. Another solution is to abolish labour mobility by tying peasants to the land. In this way landlords can appropriate the part of the product above some historically defined level of subsistence such that peasants and their offspring can survive (figure 2c) – assuming of course that labour productivity is above that level of subsistence.¹⁵

¹³ Following Sraffa (1925), we may assume that from the very beginning farmers would adopt the technique (that is a certain amount of labour per unit of land) that maximizes the average product of labour. Both marginal and average products of labour would begin to fall when land (the factor taken as given) becomes relatively scarce, so that different techniques (characterised by a higher amount of labour per unit of land) must be used. In the present context land is overabundant relatively to labour so that the maximising technique can be adopted until labour is exhausted.

¹⁴ On the distinction between the genuine classical concept of economic surplus and the marginalist notion, see the Appendix.

¹⁵ A similar case could be made to explain slavery in the United States and elsewhere. Empty land were to flee was actually available, but the race made the fugitive easily identifiable.



Panel (a) Equilibrium in the labour market with the quantity of land given and relatively overabundant in equilibrium ($\bar{T} < \bar{\bar{T}}$); panel (b) Equilibrium in the land market with the quantity of labour given and relatively scarce in equilibrium; panel (c) serfdom.

Legenda: L = units of labour; \bar{L} = actual labour supply; $\bar{\bar{L}}$ = quantity of labour that would bring land to be fully employed; \bar{T} = land actually utilised; $\bar{\bar{T}}$ = total land supply; MPL (APL) marginal (average) product of labour; MPT (APT) marginal (average) product of land

Figure 2

Once the serfdom solution is adopted, should the surplus object of the landlord's appropriation be seen as the result of a now positive marginal product of the land? No, Domar honestly replied. Since land was and remains abundant, what we are observing is a pure institutional appropriation: 'Now the employer can derive a rent, not from his land, but from his peasants by appropriating all or most of their income above some subsistence level' (that, Domar adds, may be conditioned by 'custom') (ibid, p. 20).

Discussion

Clearly, Domar's intention is to please the (conventional) economists' ears by explaining the origin of serfdom using the marginalist concept of factors' relative scarcity. Were labour and land both

scarce, the landlords would yield a positive rent and labourers a wage rate, each calculated at the respective 'marginal product'. Yet, in the actual situation in which the first of the two 'primary resources', land and labour, is abundant, the marginalist determination of distribution seems to play no role. True, the initial situation can be explained in marginal terms as in figure 2. However, without resorting to the marginalist apparatus, one can simply say that with abundant free land, peasants will appropriate all output producing it by using the technique that maximise net output per unit of labour. The appearance of a positive rent relies here on an institutional change: the introduction of serfdom.

This admission seems to validate Polanyi's assertion that neoclassical theory is inapplicable to pre-capitalist economies where personal (embodied) relations prevailed. We refrain to fully endorse these conclusions since in our view this might legitimate marginalism for market economies for which we deem it invalid as well (although for reasons different from those by Polanyi). Better founded is Marx's stance who, while deeming the surplus approach valid for any economic formation (market or non-market based), well before Polanyi reputed the pre-capitalist formations based on personal and not market relations.

True, labour immobility makes the not cultivated land ($\bar{T} - \bar{T}$) somewhat superfluous, since it is precluded to cultivation. In this way cultivated land (\bar{T}) artificially becomes a 'scarce factor' and the marginal product of land would thus become positive. Alternatively Domar might have contended that in an economy in which labour is relatively scarce (therefore with a positive marginal productivity), land relatively abundant, and per-capita productivity adequate, a rent can be extracted only from labour (which would otherwise appropriate all product), and hence the institution of serfdom to legalize the extortion of a surplus from the peasants', leaving them with the strict subsistence.

In both cases, however, the 'presence of this exogenous political variable' (serfdom), Domar admits, 'seriously weakens the effectiveness of my [marginalist] model' (ibid, p. 21). In addition, a second institutional element occurs, that is the historically defined subsistence level that limits the degree of rent extraction. One may therefore wonder whether Domar's analysis cannot be more parsimoniously re-exposed in terms of the classical theory of surplus, which explains the extraction and distribution of surplus on material and institutional elements.¹⁶

¹⁶ An important objection might be raised here by NIE: doesn't Domar vindicates the NIE view of "extractive institutions" (Acemoglu and Robinson 2012) at the origin of social injustice? The real

Once property rights are established over economic resources (or production inputs),¹⁷ their relative scarcity plays a role also in classical economics in terms of relative bargaining power. For instance, Smith explains rent as the result of the establishment of property rights over the given amount of land of a nation: ‘As soon as *the land of any country* has *all* become private property, the landlords, like all other men, love to reap where they never sowed, and demand a rent even for its natural produce. (...) [The labourer] must then pay for the licence to gather them; and must give up to the landlord a portion of what his labour either collects or produces. This portion, or, what comes to the same thing, the price of this portion, constitutes the rent of land’ (Smith 1776, p. 67, my italics). Competition for scarce land will lead to the emergence of rent. However, given a sufficient per capita output, that is a potential surplus to be mobilized, this is not the result of an intrinsic, natural property of land (its marginal productivity) but a result of an institutional factor (property) and of competition for a limited resource. The pages of the *Wealth of Nations* about the

question with NIE is not about the importance of institutions, but its identification of good (“inclusive”) institutions with pro-market institutions – incidentally, without much ethical regard to the violent ways property rights and free markets are often established. According to NIE, markets would bring about fairness in income distribution (albeit within some limits) and full employment, all based on marginalism, that is on a disputable theory. To make a comparison, Marx (1867 [1954], cap. XXVII) regarded the violent expropriation in England at the end of the 14th century of small peasants’ and communal property as a premise to agrarian capitalism and for the formation of a dispossessed working class available for the emerging industrial capitalism.

¹⁷ In a classical context the term ‘productive factors’ must be carefully avoided in favour of terms such as production inputs or resources, since in marginal theory ‘factors’ include a given quantity of a controversial ‘primary factor’, ‘capital’, along the given quantities of labour and natural resources, both measurable in physical terms. ‘Capital’ is a given fund of *foregone consumption* (originating from savings), only measurable in *value*, a quantity known *ab ovo*, i.e. before prices and distribution are determined. In equilibrium, the given capital stock should take a *physical* configuration such that a uniform rate of return on the value of each physically heterogeneous component is yield (ploughs, spades, sickles, ...). The nature of this third factor ‘capital’ would, outside a one-commodity/corn model, open a can of worms (Garegnani 2024). We should know the value of ‘capital’ to determine the value of commodities (including the capital goods), but we should know the price of commodities first to measure capital in value: a vicious circle. In the classical surplus approach the term ‘primary resources’ is anyway preferable to refer to labour and land. In this theory, capital is a set (a vector) of produced means of production (both inputs and outputs a circular production process) whose value is determined along that of any commodity in order that the same rate of profit is yield on its material equilibrium configuration. Relatively simple means of production have existed since the earliest times. In the absence of well-developed capitalist competition, however, one may refer to such anticipations in a loose way, so we do not insist on the capital theory criticism in the present context. Marx adds to the classical treatment of the means of production an institutional, figurative view of capital as a relation of production in which the property of the former allow capitalists to dominate most aspect of human activities.

limited labour's bargaining power in this regard, and the conspiracy behaviour of "masters" are too well known to be recalled here (Smith 1776, pp. 83-85). If free land is abundant (and labour scarce) serfdom or slavery are an alternative. Institutional factors also intervene in the determination of the amount of surplus that landlords (and capitalists) can extract from labour by forcing an historically determined level of labour subsistence. What remains here of the marginal product theory? Little or nothing: the mobilisation and appropriation of a potential surplus appear as political-institutional events related to the given social order, as the classical school suggests, and not mechanically linked to 'relative factors' scarcity', as marginalist theory claims.

We may well acknowledge that the advent of serfdom, in the considered historical context, hinges upon a given relative availability of two resources, labour and land. This can, however, be analysed without disturbing the marginalist apparatus of factors' demand and supply *functions*, and can rely on the classical concept of surplus extraction explained by material and institutional circumstances. We may conclude with Carus and Ogilvie (2014, p. 13) that 'Domar's model is one in which serfdom arises from relative resource endowments plus the political power of different social groups – i.e., it is broadly consistent with the conflict model of serfdom'.¹⁸

The next, more recent model relies on a traditional case of a technical innovation bringing about a change in distribution and institutions.

¹⁸ This view is reinforced by the fact that after the Black Death, when in Western Europe labour became scarce (and land abundant), for political reasons landlords failed to coalesce to reestablish serfdom and preventing the rising labour's bargaining power (Carus and Ogilvie, 2014, p. 13). Another explanation of serfdom is famously due to North and Thomas (1970) who see it as an efficiency solution to the pervasive uncertainty and risks in the violent mediaeval times. Carus and Ogilvie (2014, p. 14) note that a "fundamental problem for the efficiency view of serfdom is that much of the insecurity and injustice against which serfs were being 'protected' by their landlords was actually produced by landlords themselves. Serfdom was thus much more like a protection racket in which the landlords, as the more powerful party, generated both the problem and the solution. Serfdom did not constitute a bundle of voluntary contracts which contributed to economic efficiency, but rather was a set of rent-seeking arrangements devoted to redistributing resources from peasants to landlords". For a classic, surplus based account of Eastern slavery see Kula (1962), and Korchmina and Malinowski (2024) for a recent account based on Milanović (2013)'s re-proposition of surplus theory.

3. Of oxen, ploughs, and spades: ‘productive factors’, relative scarcity and the advent of social stratification in Bowles et al.

The archaeological background

Various archaeologists have advanced a nexus between the adoption in the late neolithic, early bronze age, of the oxen-drawn plough, suitable for extensive cultivation, the consequent arable land relative scarcity, and the dawn of social inequality in Western Europe and elsewhere (Goody 1976, Gilman 1981, Bogucki 1993, Halstead 1995, and others). Most of them (an exception is Bogucki) loosely employ the concept of surplus extraction to identify the source of income and power by the emerging élite. The idea is the following: let us start from an intensive, horticultural, hoe-based, household agriculture where – given the limited population and ability of households to cultivate large plots – land is the abundant and labour the scarce resource. As long as a potential surplus exists, exploitation is possible, but the availability of free land and the low investment required to start production elsewhere offers an opportunity to candidate exploited to avert this outcome (Carneiro 1970).

Suppose next that a new technique becomes available, the oxen-pulled plough, that permits the cultivation of much larger plots, albeit with a lower productivity per unit of cultivated land than with intensive farming, but with an output that, taking into account the advances (subsistence for workers and generous feeding for large animals, seeds and others), includes a surplus (net product per worker) that was absent or lower in the previous method. The adoption of the new technique implies preliminary investment in preparing the fields (so far free available), and buying or growing the animals. It can also be more labour-intensive at harvest time (with the techniques of the time).¹⁹ It can be speculated that some households, due to far-sightedness, stored surpluses, larger size, or just quicker, took the chance offered by the new technique for investing thus increasing per capita net output, while ‘losing’ households ended up offering labour services, or even released land, to the most able units (Bogucki 1993; Bowles and Fochesato 2024, p. 45). At this point the landscape would radically change. Once the adoption of extensive agriculture based on the employment of large animals is spread, cultivable land become scarce (and is evidently

¹⁹ Large families are from this point of view advantaged. The variability of labour requirements relatively to land at different times over the annual production cycles, alternating labour relative abundance or scarcity in different periods, limits this advantage. Selection of crops with diachronic production cycles to stabilise labour demand is one solution; recourse to temporarily hired work is another.

appropriated by the most entrepreneurial or ruthless households), and labour relatively more abundant. In synthesis, while a hoe-based technology characterised by relative scarce labour cum abundant land will generate a household roughly egalitarian society, an oxen-drawn technology marked by abundant labour cum scarce land is associated to the onset of a social stratification.²⁰

Stratification may have later evolved in a Palatial society. Halstead (1992, 1999, 2011) argues that while most of the population still relied on intensive, household cultivation, the Palace obtained a material surplus either by direct extensive production on its property land, usually in the proximity of the town (often called “staple finance” with reference to its grain consistency), or relied on taxation over household intensive production (possibly collecting non-staple goods). The Palace also engaged in in-house craft production (e.g. textiles) possibly exchanged with foreign luxuries.²¹

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The model

Bowles and Fochesato (2024, pp. 17-20), to begin with, rebut the surplus approach. They do not contest the concept in itself, nor that the onset of potential surpluses can be a necessary, though

²⁰ Poorer households not able to invest in oxen might recur to less efficient work animals like cows (that have double usages) or donkeys, or rented oxen. Renting, though, is also not efficient since their availability might come too late during the production cycle (after harness animals are more timely exploited by the owners). More likely, periodic wage labour in extensive farming is used by poorer households to integrate subsistence. Halstead (2014) shows that a dual system (poor intensive cultivation and extensive production) persisted under different institutional circumstances in Greece under the Turkish domination and later.

²¹ Nakassis, Parkinson and Galaty (2011) criticised a too hasty application of the Polanyian concept of “redistribution” to the Aegean palace economy. The idea of a redistributive palatial system is that the Palace collects and later redistribute subsistence goods (retaining a surplus, of course). Since long ago Paul Halstead (1992, 1999, 2011) has emphasised the coexistence of modes of production and sources of surplus extraction. In the Mycenaean Palatial system, for instance, a household ‘intensive’ production coexisted with the Palace’s extensive production from which it obtained most of the surplus, later redistributed to functionaries and artisans (see also Liverani 1998, pp. 27-28 on the Near East). From a methodological point of view we find extremely interesting the suggestion by the Marxist historian De Ste. Croix that what matters in understanding stratification is not which production mode is quantitatively prevalent, but from which production mode the élite derives its surplus (de Ste. Croix, 1981, 172).

²² Gilman (1981) assimilates early household adoption of the oxen-plough technology as well as long-term investment in producing olive oil trees, vineyards, or in terracing hilly plots, irrigation elsewhere etc, to irreversible capital investment. Developing an early argument by Gordon Childe (ibid, p. 5), Gilman argues that while this “capital-intensification” stabilised the production of subsistence goods, protection would be required that could easily transform protectors in oppressor, while the irreversibility of investment made mobility not convenient (ibid, p. 7).

not sufficient, premise for inequality and for the institutions that accompany its inception (they quote the surplus-based paper by Branko Milanović [2013] in this regard). Rather, they challenge a certain mechanic causality that, from Engles to Childe, has been supposed between potential surplus and its actual mobilization as the basis of a stratified society. As such, the criticism – or rather qualification – has already been shared by the present author (Cesaratto 2024c, Cesaratto and Di Bucchianico 2021a/b).²³ Per se, in fact, this criticism does not touch the merit of the concept and does not, therefore, justify the replacement of the classical surplus theory with the marginalist conceptual apparatus. Quite the opposite, the criticism enhances the surplus approach, as argued above.

Reliance on ‘habitual modes of thought’ (a famous Keynes’ expression) leads nonetheless Boogard, Fochesato and Bowles (2019) and Bowles and Fochesato (2024) to prefer modelling the relationship between the adoption of oxen-drawn ploughing and the occurrence of stratification on marginalist principles, namely the relative scarcity of labour and land. Income equality, so they begin, was roughly prevalent both in the hunter-gatherers communities and, after the adoption of agriculture, in the earlier neolithic societies (e.g. Bowles and Fochesato 2024, p. 2 and *passim*). Explained in marginalist terms, social stratification emerged later from the transition from an earlier, relatively labour-intensive ‘garden farming system’, to a relatively land-intensive ‘field-based farming’ permitted by the adoption of the oxen-drawn plough (Boogard et al. 2019, p. 1130-1131). Expressed in other words, from a ‘change in limiting factors from labor to land and other form of material wealth’ (Bowles and Fochesato 2024, p. 36).²⁴ The relative scarcity of factors affects in turn the ratio between the two factors’ marginal productivity along well-known lines:

We model differences between two ideal types of farming system: system A is labour-limited compared to system B if labour is more valuable relative to land—or other forms of material wealth—in A than in B. This greater relative value is measured by the increase in total output that an additional unit of labour input would allow—its marginal product. In other words, labour is more scarce relative to land in A than in B, where ‘scarcity’ refers to how valuable labour is relative to land (i.e. the relative marginal product of labour is greater than that of land) (Boogard et al., p. 1131).

²³ In fact, Polanyi’s criticism is echoed by Bowles and Fochesato (2023) in terms strikingly close to those used by Cesaratto and Di Bucchianico (2021a/b) that they possibly sensed give their familiarity with the present author’s department.

²⁴ ‘Other form of material wealth’ is not a ‘production factor’, it is just a hypocrite way to avoid the employment of the controversial notion of ‘capital’.

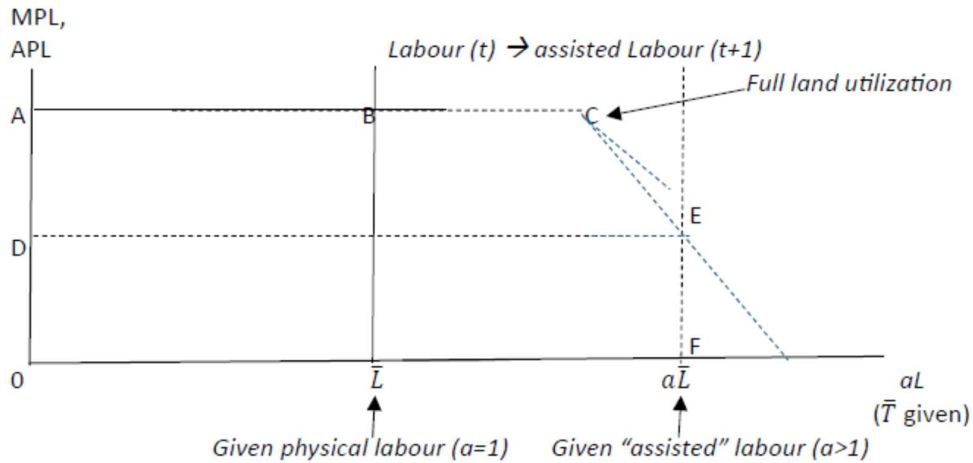
Let us take again advantage of figure 2a/b (section 2) showing, respectively, a labour and a land marginal productivity curves.²⁵

Figure 2a shows an economy with overabundant cultivable land, so that the marginal productivity of labour remains constant (and equal to the average productivity) until the labour supply at \bar{L} is exhausted. Figure 2b shows that when \bar{L} is employed while land is still abundant the rent rate is zero. All product is absorbed by workers' subsistence that adjusts to their average productivity.

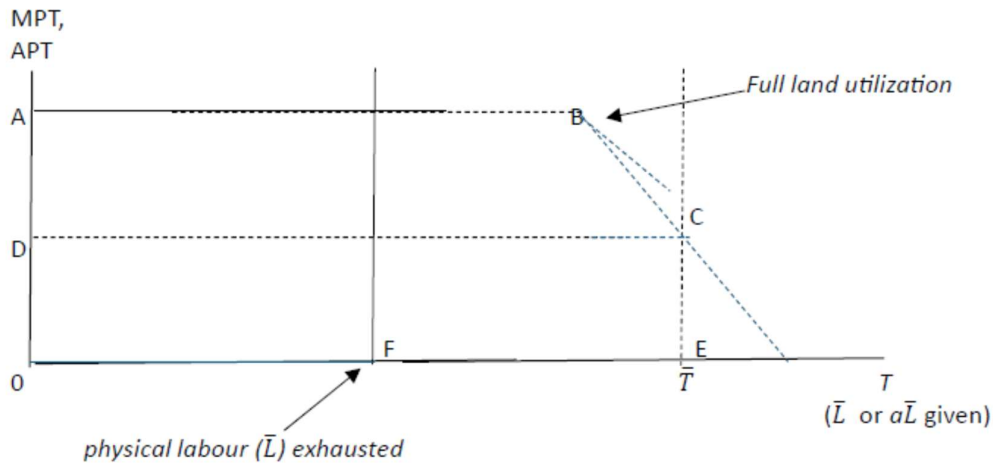
The adoption of the oxen-drawn plough technology is treated by Bowles and co-authors as a 'labour augmenting' technology, an increase of labour in efficiency units. Labour-augmenting technical progress should not however involve the introduction of costly capital-goods (oxen and plough), but only some learning-by-doing improvements in labour dexterity. Let us concede, for the sake of the argument, this cavalier way to proceed. The larger amount of the composite factor 'plough-assisted labour' thus allows extensive production, making land scarce. In short, in marginalist terms we pass from an economy where labour is relatively scarce and land overabundant, to one in which, after a technical innovation, assisted-labour is relatively abundant and land relatively scarce.

Figure 3a draws the marginal product of a composite factor aL (plough-assisted or 'augmented' labour). This time, the marginal productivity of aL falls before its supply is exhausted. Symmetrically, figure 3b shows a positive marginal product of land (rent is positive).

²⁵ Bogaard et al. (2019, fig. 2), and Bowles and Fochesato (2024, fig. 5) employ equivalent marginalist presentations using, respectively, production functions and isoquants.



$AB\bar{L}O$ = subsistence to L at time t ; $ACED$ = rent at time $t+1$; $DEFO$ = subsistence to aL at time $t+1$.
(a)



OF = rent zero with unassisted labour \bar{L} (at time t); $DCEO$ rent with assisted labour $a\bar{L}$ (at time $t+1$); $ABCD$ subsistence (received by $a\bar{L}$ at $t+1$).
(b)

In figure 3a the area $AB\bar{L}O$ represents the subsistence to physical labour \bar{L} in the old situation. $DEFO$ is the subsistence to the composite factor after the introduction of the oxen-drawn plough. Notably, subsistence must be enough to feed workers and oxen. If not sufficient, the rent rate would not be determined by the land's marginal productivity but as a residual (a surplus in a classical sense) after that subsistence to 'assisted labour' has been provided. In figure 3b we see that since land has become relatively scarcer, its marginal and average productivities are positive. From point B, in correspondence to the exhaustion of assisted labour, they both fall. The rent rate is determined where the marginal curve meets land supply. $ODCE$ is obviously total rent, while

ABCD is the part of output that goes to the composite factor.²⁶ This description meets Boogaard et al.'s (2019, p. 1134) argument:

The ox team increases both the total output (...) and the marginal product of land (...). (...), as the use of the ox team is equivalent to an increase in the amount of labour applied to the land, the marginal product of labour will be lower with the ox team.²⁷

Technical change would thus bring about a new relative proportion between production factors such that the community moves from moderate inequality – however enough to prompt the acquisitive action of some household – to a ‘class’ stratified society where some owned ‘a considerable amount of land and one or more teams of oxen, and others working for them under some kind of subordinate relationship as renters, sharecroppers, clients, employees or unfree labour’ (Boogaard et al. 2019, pp. 1136-1140). This is a ‘plausible precursors of temple- and palace-based landholding institutions’ (ibid). In other words, ‘the transition to a land-limited economy may therefore have been a step along the way not only to sustained wealth inequalities, but also to the emergence of permanent political inequalities formalised in new structures of governance’ (ibid).²⁸

Consistently with Halstead’s authority, Boogaard et al. admit the coexistence under the palatial system of both land- and labour-intensive farming as part of an “agroecological continuum” (ibid, p. 1136). Presumably, the most traditional household sector became a source of labour supply for the “modern” sector which alternates during the same production cycle periods of low and high labour-intensity (a sort of dual economy à la Lewis).

Discussion

Like in Domar, the question is whether the marginalist apparatus that explains income distribution in term of the relative scarcity of production factors does really add something substantial to the

²⁶ As noted, the term surplus can be declined also in a marginalist sense. In figure 3 (left side) rent may for instance appear as a surplus after labour is paid at its marginal productivity; but this is not a surplus in a classical sense (see Appendix A).

²⁷ There is a second way of representing the events in marginalist terms by measuring L in physical units, and representing the technical change by an upward translation of the marginal product functions

²⁸ Land, working animals, slaves, and other forms of material wealth can be passed on through inheritance enabling the intergenerational reproduction of elites (e.g. Bowles and Fochesato 2024, p.3 and passim).

story.²⁹ Indeed, the archaeological research Bogaard et al. (2019), and Bowles and Fochesato (2024) refer to is mostly based on the concept of social surplus, which one of the authors has also employed in the past (Bogaard 2017, p. 50 and *passim*). Since the famous pages by David Ricardo on technological unemployment, in the classical approach technical progress may change the relative employment of *resources* in production, for instance of labour and land, so to make them relatively under or oversupplied. In fact, Bogaard et al. (2019), as much as Domar, feel the necessity to recur to circumstances such as “the *limited bargaining power* of these newly dependent classes in a labour abundant economy” (ibid, p. 1139, *my italics*) to determine income distribution. This is more akin to the classical rather than to the neoclassical tradition.

Notably, the criticism to neoclassical capital theory is fatal to the marginalist curves. Bowles and his associates avoid the introduction of a ‘capital’ by very loosely considering its introduction a form of ‘labour augmenting’ technical progress. Of course, we recognise a basic difficulty in applying modern theories to ancient economies in which markets existed in a very relative sense. But this in no way allows for analytical ease. Be this as it may, for the sake of argument let us turn to a second order of critiques that Sraffa made of the marginalist apparatus, one that should greatly appeal to the ears of historians.

Sraffa often returned on an early, different critique of ‘marginism’ to the marginalist functions, albeit eventually deciding not to develop it in *Production of commodities* where it is nonetheless mentioned (Rosselli and Trabucchi 2019). The criticism concerned the artificiality of the marginalist production curves in that these curves presuppose a continuum of changes in factors’ proportions that is not observable.³⁰ With regard to the narrative of Bowles and associates, Sraffa

²⁹ More fundamentally, one may wonder if it makes sense to explain of inequality using marginalist distribution theory. In this theory each factor receives its marginal contribution to production so it is difficult to speak of inequality (see appendix A). In the classical approach, instead, distribution is related to the bargaining power within a given institutional context.

³⁰ Amartya Sen defended this presentation as counterfactual (Rosselli and Trabucchi 2019, p. 222). This a weak defence. The non-economist may observe that the neoclassical curves describe a continuum of potentially ‘*readily-appliable techniques*’ (proportions between factors, say labour and land), drawn for a *given technological base*. Suppose next that, because a change in relative factors’ prices, firms want to change the applied technique in use. If the new technique is only ‘theoretical’ (is not in the book of technical recipes available to firms), the new technique will have to be studied and developed by engineers. But in that process, new technological knowledge is likely to emerge, and not exclusively aimed at saving the factor that has become more expensive, but at lowering production costs in general (Rosenberg 1969, p. 2, among others). Once this happens, the economy will tend to a new equilibrium point that will not lie, *pace* Sen, along the initial ‘counterfactual curve’. For marginalist theory to work, all the points along a curve (all

would have perhaps observed that a woman having come twice from another planet, once in the age of the manual hoe and once in the age of the ox-drawn plough, would have detected two different productive arrangements, two points describing different techniques characterised by different proportions among the resources employed in production and respective bargaining power. *Certainly, however, she would not have observed two points along different curves.* Even if she were to witness the transition between the two points, would marginalist functions be useful in describing the transition? No, because the observer might well observe technical experiments, but within these experiments it would be hard to distinguish between changes of techniques (the proportions between L and T) and changes of the technological base: the curve will shift as the consequence of the movement along it.³¹

This criticism develops that made earlier by others including J. A. Hobson and none other than Vilfredo Pareto (who in fact used fixed production coefficients)³² that worried Alfred Marshall not

potential applicable techniques) must thus be actual (a spectrum of new techniques immediately adoptable) (see however Atkinson and Stiglitz 1969). This leads to the conclusion that the realism in marginalism is the only really scarce factor here!

³¹ As recalled in the previous footnote, *given a certain technological base*, farmers would for instance select a specific applied technique on the basis of the relative (shadow) prices of labour and land, (shadow) prices that, in turn, reflect the factors' relative scarcity. (We talk of *shadow* prices, as also Bowles and Fochesato [2024, passim] do, since in these ancient economies we cannot speak of proper market prices: we may just presume that farmers have in mind some implicit relative value of productive resources). Given this marginalist framework, it is however difficult to imagine that a change in the *technological base* gives place to a *whole new set of techniques* (entirely new curves). We likely move from a *single* productive equilibrium to a *single* new one (we do not move from a point along an initial curve to a point along a new one). True, given a new technological base farmers may experiment with different applicable techniques, but it is likely that this experiments generates further changes in the technological basis, as noted in the previous footnote. Experimentation along a curve cannot thus be considered as taking place in logical time but must be considered in a historical time when technological knowledge may well change (perhaps as a result of the experimentation itself). *There are no curves to be observed or drawn then, but only points.* This is the perspective of the classical economists interested in studying the *potentially observable* functioning of a given economic system, in particular its ability to produce a surplus (Pasinetti 1977), and not presumed and unobservable 'potential' properties.

³² In principle, marginal theory can do without variable production coefficients and rely on consumers' preferences to draw factors' demand curves. The idea is that after the oxen-plough revolution and the adoption of a more land-intensive technique the price of cereals (supposedly the staple product of extensive agriculture) become cheaper than labour-intensive (gardening) products (say beans). Consumers would therefore demand more cereal and less (say) beans, and the relative demand price for hiring land (rent) would rise relatively to the price of labour. Although less demanding than technical substitutability, also the substitutability among consumption goods meets severe limits.

a little (Marshall was always concerned that marginalist principles were as close as possible to concrete experience, and therefore more persuasive) (Rosselli e Trabucchi 2019, p. 225, Trabucchi 2011).

In synthesis, the reference by Sam Bowles and his associates to material factors as the cause of social change is interesting and, albeit not original, it leads to a useful criticism of the influential work by Acemoglu and Robinson (2012) that attribute social stratification to the appearance of “extractive” institutions, without much explanation of their origin (this criticism applies to Douglass North as well, see Cesaratto 2024b). This development is now given a material origin. Nonetheless, the ‘marginist’ stylization of this origin sounds superfluous if not misleading, useful only to appease conventional economics, while what matters is the historical change in the relative bargaining power of social groups, after episodes of technical progress, affecting the extraction and distribution of the social surplus.

4. Allen, Bertazzini, Heldring et al. on the hydraulic hypothesis

Also the next two papers openly reject what they define as the dominant [sic] surplus-based account of the birth of the State and stratification. The explanation of both is based on well-known historical and archaeological material hypotheses that the paper tests and confirms on large data basis.

The first paper is mainly concerned with the much studied archaeological region of South Mesopotamia and refers to the time-honoured “Hydraulic Hypothesis”.³³ Object of criticism is the identification of the emergence of proto-states with the extraction of a surplus from the population (Allen et al. 2023, p. 2508 and passim). “Extractive theories of government” are attributed to a wide spectrum of authors from Marx and Engels, Vere Gordon Childe to Acemoglu and Robinson (see Allen et al. 2023, pp. 2514-5 for a short review). If this theory was right, so the argument goes, states appeared where an exploitable agricultural surplus was available, for instance in locations where water was naturally available, e.g. along the two famous Mesopotamian rivers. More in general extractive theories would posit some automatism between the emergence of agriculture and the formation of states, variously mediated by factors such as the existence of taxable output (an argument examined in section 5), or by being a fertile region

³³ The early formulations of this theory are in Adam Smith, and later in J.S. Mill and Marx (Anderson 1974, p. 467-475 and passim for a critical review). More recently Karl Wittfogel (1957) popularised it.

surrounded by an unproductive or inhospitable land making the running away of the exploited population less rewarding (Carneiro 1970).

The ‘social contract theory’ supported by Allen et al. (2023) would instead contend that proto-states emerged where water for agricultural uses was available only through irrigation works that needed to be somehow coordinated by some authority. This theory ‘is close to the standard view of government in welfare and public economics’, in which individuals ‘may be willing to give up resources and autonomy to such a government, as part of a “social contract” (...). Their willingness fundamentally stems from problems of externalities (...) and coordination failure (...) in the private provision of public goods and services’ (ibid, p. 2508). This would be the case of the documented episodes of Mesopotamian rivers’ ‘shifting away’ leaving the populations, formerly gaining their life from a natural access to water, in the alternative of either returning to nomadism in the by now desert surroundings, migrate in new regions, or restore the access to the water by irrigation works which necessitates of some local coordination. The gratitude of the community to the coordinator leaders, likely expressed through tributes in kind, may have later elicited the emergence of more rapacious forms of exploitation. The resulting theory is that ‘states formed where the returns to solving coordination failure, not expropriation, were higher’ (ibid, p.2509). Only later, the authors concede, when ‘governments [needed] to be endowed with some enforcement power, (...) this power [could] be used to repress or extract’ (ibid, p. 2510, see also 2537-8 and passim).

There is a continuity, they also concede, between preexisting³⁴ institutional governance by kinship groups called ‘lineages’ and larger scale governments since ‘faced with a coordination problem, lineages formed governments by scaling up their internal social structure to encompass multiple communities’ (ibid, p. 2510). Coordination problems would anyway explain the formation of early states inconsistently with ‘Marxist theories of the origins of government that emphasize coercion’ (ibid, p. 2510, 2512 and passim).

As in the case of Sam Bowles and his associates, also Allen et al. do not discuss the merit of the concept of surplus,³⁵ but only its mechanical application as a semiautomatic ‘inducer’ of state

³⁴ Preexisting to rivers’ shifting.

³⁵ The ‘naturalness’, so to speak, of using the concept of surplus in a classical sense is such that Allen et al. (2023) in footnote 15 endorse a paper which ‘also emphasize[s] geographical factors as important in predicting, where surplus generation and the simultaneous protection of surplus will arise’.

formation. Archaeologists will evaluate the merits of the 'cooperative' thesis of the formation of early forms of proto states. Likely, they will not dispute it since it is entirely plausible that the process toward the formation of 'extractive' states slowly sprung from spontaneous forms of cooperation (e.g. Liverani 1998, p.26). At several points of their argument, moreover, the authors acknowledge the subsequent transformation of cooperative forms of government into extractive states (e.g. Allen et al. 2023, pp. 2510, 2535, 2537). It is caricatural to argue that the surplus approach cannot take these steps into account.

The application of the 'neoclassical' theory of the state as producer of public goods seems therefore not only redundant, but not even general being the *ultimate* historical results more in line with the idea of the state expressed by Marx or Childe than that by Baumol (1952), to whom Allen et al. refer to. It is not surprising, anyway, that exploitative authorities emerged from communitarian institutions, as is also the case with the communal storage of grain considered in the next section.

5. Mayshar et al. on the appropriability (storage) hypothesis

The adoption of agriculture and the abandonment of preceding forms of subsistence requires the selection of a basket of products (vegetable and animal) such that: (a) an adequate diet is assured (Diamond 2005 [1997]) and, since harvests are typically periodic, (b) it is known how to store the main staple food for seeding and deferred consumption (cereals and rice have represented the typical storable products³⁶).

Storage is also necessary to set aside some surplus over normal replacement requirements and subsistence in the anticipation of unfortunate future events, such as famines, floods, etc. These surpluses are referred to in the literature as 'normal surpluses' (e.g. Halstead, 1989; Urem-Kotsou, 2017). Storage in turn entails a social management and defence against potential predators. Custodians might however slowly take control of the common resources.³⁷ 'Normal surpluses' may thus constitute an intermediate step towards the extraction of exploitative surpluses. In Neolithic societies, with the agricultural revolution and the adoption of storable cereals as basic

³⁶ Also animal husbandry is also a form of storage, at least to the extent that it does not burden basic food reserves.

³⁷ Cyclically more drought-prone climates may require more systematic provisioning of normal surpluses and thus be more exposed to social stratification (Allan 1965). Prof. Paul Halstead recalled this hypothesis in a conference on the *The Archaeology of Affluence* held in Bologna in May 2024.

food, storage became systematic and massive. The control of warehouses and of social surpluses was then progressively taken over by élites, constituting the key step for stratification (Testart 1988, Liverani 1998, p. 50, Scott 2017 among others). The management of warehouses and 'normal surpluses' might have indeed provided priests or personalities who impersonate the fortunes of the community with the occasion to transform themselves into a dominant élite. Polanyi denominated these economic formations 'redistributive'. In this explanation, material as well as institutional events combine to explain the simultaneous appearance of exploitative surpluses and stratification overcoming the hen-egg dilemma over their correct sequence.

While referring to this 'storage' theory, Mayshar et al. (2022, p. 1092) openly reject its frequent associations to the surplus approach done by Childe, Diamond, Scott and many others, that they label 'conventional (sic) productivity theory'. Mistake of surplus theory is of not distinguishing between storable and non-storable surpluses. Only the former would pave the way to inequality. However, this is not a criticism but, again, a qualification.

Be this as it may, Mayshar et al. find in the appropriability of *storable* crops, particularly of cereals, the premise to the emergence of the élites; namely, 'when it became possible to appropriate crops, a taxing elite emerged and that this led to the state' (ibid, p. 1094). Moreover, 'stored cereals are appropriable not just by a would-be elite but also by bandits—therefore, their cultivation generated a demand for protection and at the same time facilitated taxation to finance the supply of such protection by the elite' (ibidem). Instead, and contrary to the predictions of 'productivity theories', a surplus of *non-storable* goods would not generate hierarchies (ibid, pp. 1133-1134 and passim). These authors intend to deny any role to the concept of surplus (even of storable foods) insisting on an 'institutions → surplus' sequence. In their words, 'the elite generate the food surplus on which it can flourish, once the opportunity to appropriate rises' (Mayshar et al., 2022, p. 1093): the élite comes before the surplus (a sort of step back to the 'institutions come first' approach by Acemoglu and Robinson, one may think). To the objection that the creation of a non-food producing elite presupposes the existence of an actual or at least potential surplus, they answer that tax confiscation may take place even with no surplus available (Mayshar et al., 2022, p. 1093). To prove this, they resort to marginal productivity theory.

They consider (ibid, p. 1093) a non-aggressive subsistence 'farming society' that produces storable goods ('cereal grain') 'stored for year-round consumption'. Next, even if this community does not produce a surplus (or just a 'normal surplus'), a 'tax collector', we may suppose from a bully population, confiscates part of the amassed grain 'for consumption by distant elite and other non-

food producers'. This 'confiscation' determines a fall in the farmers' subsistence level so that population would shrink and 'and eventually eliminate the source of income for the elite'. In this way, however, labour becomes scarcer.

A decreasing labour supply, given the amount of land, will determine a rise in the marginal productivity of labour, so that 'the smaller population would produce higher output per farmer' and a new (...) equilibrium with a stable population in which total output exceeds the farming population's subsistence needs, with the surplus confiscated by the nonfarming elite' (ibidem).

We make sense of the model in figure 4. The land supply is given and, initially, common property of the productive population (farmers), or equally allotted. In this egalitarian society all product is distributed to workers so that each worker receives a remuneration equal to her *average product*. We assume that this reward corresponds (or has with time become equal) to the customary subsistence level S (which includes generational reproduction) at which population is stationary. Point B, where the *average* productivity is equal to S indicates the initial equilibrium.³⁸ Later, an aggressive population arrives and loots part of the product taking control of the land, so that the standard of living falls, say, to S' , below the subsistence level. The local population would shrink and a new equilibrium is found in point B', where the *marginal* product is equal to the given S . In the new equilibrium a smaller, stable farmer population OA' enjoy again a subsistence level S , with total subsistence equal to OA'B'S. Marginal increasing returns to labour, given land, are such that the new élite collects a rent given by the trapezoid SB'CD.

³⁸ An actual subsistence higher than S would induce an increase of population and, given decreasing returns, a fall of average productivity and subsistence. So population would return to the stationary level.

‘reliance on appropriable crops increases the tax capacity of the elite, independently of predation by outsiders and the functional demand for security’ (ibid, pp. 1136-1137).

The endorsement of the appropriability of storable crops as a mechanism explaining inequality is welcome, albeit is far to be original (see e.g. Scott [2017], Testart’s [1988], Liverani [1998, p. 50]).⁴⁰ What is disputable is the marginalist fairy tale negating the role of potential surpluses by affirming that élites (institutions) come first. A co-evolution of potential surpluses consisting of storable and appropriable crops and of the formation of élites is more appropriate.

Conclusions

The paper moved from a critical review of three approaches to pre-capitalist societies, the marginalist (named formalist by Polanyi and including NIE), the Polanyian (substantialist) and the classical surplus approach. We welcomed the constructive elements of Polanyi’s criticism to the surplus approach in the necessity of an accurate combination of surplus and institutional analyses. In this light we examined some recent mainstream contributions concerning the origin of inequality and related institutions. Those papers have some challenging aspects. They adopt materialist explanations of the origin of inequality and institutions — particularly related to technical progress — partially breaking with the NIE’s reliance on market failures (transaction costs), or to self-feeding ideologies and beliefs, to explain institutions (Cesaratto 2024b). They rely on hypotheses drawn from archaeological studies, quite often from scholars that use the concept of social surplus. Yet the mainstream contributions openly reject the classical surplus approach, with poor arguments, to say the least. The material hypotheses they study are interesting — although the evaluation of the most empirical parts we leave to the ancient studies scholars — and involuntary support the relevance Marx attributed to the production sphere as trigger of institutional change. Moreover, the variety of material hypotheses they evoke are not reciprocally inconsistent.

Having said so, on the methodological side, these studies recover the formalist tradition, employing marginalist concepts, in particular the relative scarcity of production factors, to explain

⁴⁰ Bowles and his associates are also critical of the “storability hypothesis” about the origin of inequality put forward by Mayshar et al. (2022) in so far as cereals begun to be stored about five millennia before the emergence of proto-states that sanctioned a social stratification (Bowles and Fochesato, 2024, p. 67).

the onset of inequality. Those concepts are of a doubtful spurious nature, and were born to deny the existence of exploitation, not to affirm it. No doubt that their use might please conventional economic thinking. How to dispose of them?

Marx (1865, p. 22) compared the open evidence of exploitation in slavery and serfdom, that would leave ‘our Liberals overflowed with moral indignation’, to its hidden nature in capitalism where ‘the *unpaid* labour seems to be *paid* labour.’ Elaborating this point, Garegnani (2018) regarded exploitation in slavery or feudalism as self-evident and founded on ‘the (feudal) social order [that] does not allow serfs to appropriate the entire product’ (ibid, p. 640). Superficially, Garegnani points out, ‘that the worker does not receive the entire product’ is apparent also in capitalism, a fact that ‘you certainly need no theory of value to ascertain’ (ibid p. 641). Having capitalism in mind, however, ‘the mere fact that the social order does not allow the workers to appropriate the entire social product, is a question the answer to which can only be inferred from the entire body of economic theory’ (ibidem).⁴¹

In this regard, the Classical and Marginal theories provide two alternative explanations of the origin of profits in capitalism. The surplus approach would ‘confirm that profits owe their origin merely to the social order’, not less than with serfdom (ibidem). Marginalists, on the other hand, reject any evidence of exploitation, both in pre-capitalist and in market economies, to the extent that the ‘residual claim’ of the landlord or of the capitalist consists of the remuneration of the ‘production factor’ land or ‘capital’. Thus, ‘a foundation *other* than the mere fact of the existing social order could be shown to exist if modern marginalist theories were correct and the rate of profit were ultimately the price of a “scarce” factor of production.’ (ibidem, my emphasis)

To get rid of the marginalist explanation of the origin of profits in capitalism, Garegnani contends, the modern surplus approach relies on the analytical criticism of marginal theory— the rightly famous critique to the neoclassical notion of ‘capital’,

from which it emerges that profits have no systematic explanation other than the fact that the existing social order does not allow workers to appropriate the entire product. If, then, this approach holds and it is legitimate to describe the revenue of a feudal lord as the result of labour exploitation, it will seem to be no less legitimate to describe profits in the same terms” (ibidem).

⁴¹ The bottom line is that Marx is right to say that in capitalism exploitation is hidden. Interestingly, John Hicks (1969, p. 24) freely admitted that surplus theory is valid for pre-capitalist economies where distribution is regulated by institutions and not by the market.

This conclusion validates the surplus approach as a correct explanation of profits in capitalism. It also delegitimizes Polanyi's approval of marginalism as a pertinent view of market economies. However, we are still left with the 'parables without capital' of the kind reviewed above to explain inequality in pre-capitalist economies. In this narrative only two *measurable* factors, labour and land, are used, escaping the capital theory critique, so that distribution is still explained as the result of relative factors' scarcity and not of the given social order. Paradoxically, Polanyi's tenet is turned upside down: marginalism suits ancient formation and not market economies! There are two problems here.

To begin, these models consider the produced means of production negligible in the antiquity or, as Bowles and his associates do, attribute them much importance but consider their contribution as part of labour efficiency avoiding anyway the explicit consideration of an embarrassing 'production factor' for neoclassical scholars. This cavalier procedure cannot be motivated by the limits that the application of modern theory to ancient economies does and must meet.

In addition, these authors press in fact hypothesis of neoclassical theory which are doubtful for advanced economies and ludicrous for more primitive formations. We found here useful the less known Sraffian critique of 'marginism' to the application of the neoclassical apparatus. Using marginalist functions related to production is already questionable in a capitalist context, where, at least, one can imagine that teams of engineers design, on the basis of given technological knowledge, a range of the most cost-effective techniques (proportions between factors) relative to a continuum of relative factor prices.⁴² Their use becomes then even more questionable when used in pre-capitalist formations, as the papers here reviewed do, even as heuristics. As Sraffa (1960, p. v) noted in his major work: 'The marginal approach requires attention to be focused on change, for without change either in the scale of an industry or in the "proportions of the factors of production" there can be neither marginal product nor marginal cost. In a system in which, day after day, production continued unchanged in those respects, the marginal product of a factor (or alternatively the marginal cost of a product) would not merely be hard to find—it just would not be there to be found'. Observe that 'change' in the marginalist context has nothing to do with historical or technical change but only with the potential availability of a continuum of readably adoptable techniques if factors' relative costs hypothetically vary after a change in their relative

⁴² The design of a series of hypothetical alternative techniques is a costly activity, so even in capitalism this is rather unrealistic.

scarcity. If, as plausible, those techniques are not there, ‘the marginal product of a factor (...) would not merely be hard to find—it just would not be there to be found’. Of course, if the relative supply and price of productive resources changes, new techniques may be sought — which do not necessarily economise on the factor that has become more expensive — as part of the broader development of new production methods. It is unrealistic to pretend that we are moving along a curve representing a series of coexisting alternative techniques.

Even as heuristic, marginal productivity theories, therefore, mislead and impoverish historical research into the material and institutional change of ‘observable’ productive configurations. Sraffa’s ‘marginism’ vindicates, in a sense, Polanyi’s thesis of the inapplicability of marginalism to pre-market societies. Are we therefore left without an economic guide to ancient societies? No. The classical economists, as much as economic archaeologists today, were interested in the functioning of the economies as circular systems (Bellino 2023) – the best example being Francois Quesnay’s *Tableau Economique*. Pasinetti (1977, p. 63) posits a derivation of Wassily Leontief’s famous input/output analysis precisely from the *Tableau*. They may be guide the social scientist to study ‘the technical properties of the economic system’ to ascertain if they are ‘such as to permit the production of at least some commodity in addition to those needed for the replacement of the means of production used up in the production process’, that is if it can generate a surplus; or if ‘an economic system were technically so backward that it was not even capable of reproducing the inputs which it had used up (...) [so that] it could not survive (i.e., it would not be viable)’ (ibid, p. 63). This analysis relies entirely on potentially measurable quantities and does not require assuming the existence of shadow prices or ranges of hypothetical techniques, as when marginalist curves are employed. Moreover it doesn’t need to conceal ‘capital’ in ‘assisted labour’ as Bowles and his associates do. Produced means of production will appear both as inputs and outputs of a circular system, as in the case of oxen and ploughs in Halstead’s theory. Conversely, Pasinetti (1977, p.31) concludes, marginal theory ‘has accentuated to the utmost⁴³ the notions of change in the proportions and of substitution among the factors of production, as a necessary consequence of the variation in the opposite direction of the ratio of their prices (rate of profit and wage rate)’.

The surplus approach is an entirely general theory applicable to all kinds of socio-economic arrangements and has the agreeable characteristic of having to be complemented by material

⁴³ ‘To exasperation’ in the Italian original.

historical, institutional analysis (Aspromourgos 2024, pp. 12-13)⁴⁴ and, we may add, socio-biological studies. Marginalist curves do not seem to be of much help in this research.

Appendix – On classical and neoclassical surpluses⁴⁵

In a Classical sense the social surplus is what remains once what is necessary to start a new productive cycle at least at the same activity levels - material inputs and the historical determined necessities for the working population - is set aside (e.g. Garegnani 1984; Pasinetti 1977; Bellino 2022).

In a sense, the existence of an economic surplus in production is recognised also by marginalists.⁴⁶ Let us consider the conventional factors' marginal productivity curves for labour and land (we avoid 'capital' with all its measurement troubles).⁴⁷ Figure 1 draws these curves for a single productive unit, assuming, for the sake of the argument, that the economy consists of that unit only.⁴⁸ The decreasing portion of the functions represents the factors' demand function. Given the factors' supply (not drawn), competition will lead the economy to a natural income distribution with an equilibrium real wage equal to w^* and a rate of rent on land equal to r^* .

⁴⁴ For instance, using a surplus theory, Branko Milanović (2013) measured the rate of exploitation in different epochs.

⁴⁵ Taken from Cesaratto (2019). See also Nuno Martins (forthcoming) for a comparative review of the concept of economic surplus in economics.

⁴⁶ We are not considering here the Marshallian consumer's surplus and a producer's surplus. The former surplus is defined as the geometrical area below the demand curve, and above the horizontal line corresponding to the equilibrium price. The producer's surplus is defined as the area above the supply curve, and below the horizontal line corresponding to the equilibrium price (see Martins, forthcoming).

⁴⁷ More rigorous of his modern followers, Wicksell draws the marginal productivity curves taking labour and land as 'factors of production', aware of the difficulties of measurement of 'capital', the special treatment of which he defers to subsequent chapters where, alas, he fails to solve the conundrum.

⁴⁸ As noted in footnote 12, following Sraffa (1925) in drawing the curves, we presume that from the very beginning firms adopt the technique (the capital/labour ratio) that maximises the average product, so it is incorrect to draw a camel-shaped curve of the marginal product as usually done in conventional textbooks. Looking at figure 5a, along the segment OC the firm produces the average product OA. However, at point C, given the limited endowment of capital (of labour in figure 5b), the firm cannot continue to produce with an average product maximizing technique. Therefore, both the average (the dashed curve) and the marginal product begin to fall.

Take figure 5a. The trapezoid ABCO represents the total product, while the area wBCO represents the wage bill. The area ABw might well be called economic surplus, what each worker produces above her wage. If it was a capitalist who hired the workers, in the terminology of Wicksell (1934, 113) he would be defined “residual claimants” of this surplus. But would this claim be the result of exploitation? Symmetrically to figure 5a, in figure 5b the trapezoid ABr also represents an economic surplus, what each unit of land produces above its remuneration r . If, following Wicksell, we assume that it is a cooperative of workers that is renting land then, by analogy, we might conclude that the residual claimant cooperative is exploiting land. As shown by Wicksell (*ibid*, p. 126), however, the hypothesis of constant returns to scale is enough to show that each “production factor” will receive its full contribution to production calculated at its marginal return. In terms of figure 5, the area ABw corresponds to the area rBCO, that is that the economic surplus in figure 5 is not the result of land abusing labour, but of the contribution of land to the value of net output calculated at the marginal product of capital; symmetrically the economic surplus in figure 5b is not the result of labour exiting capital, but of the contribution of labour to the value of net output calculated at the marginal product of labour (the area ABr corresponds to the area OwBC).

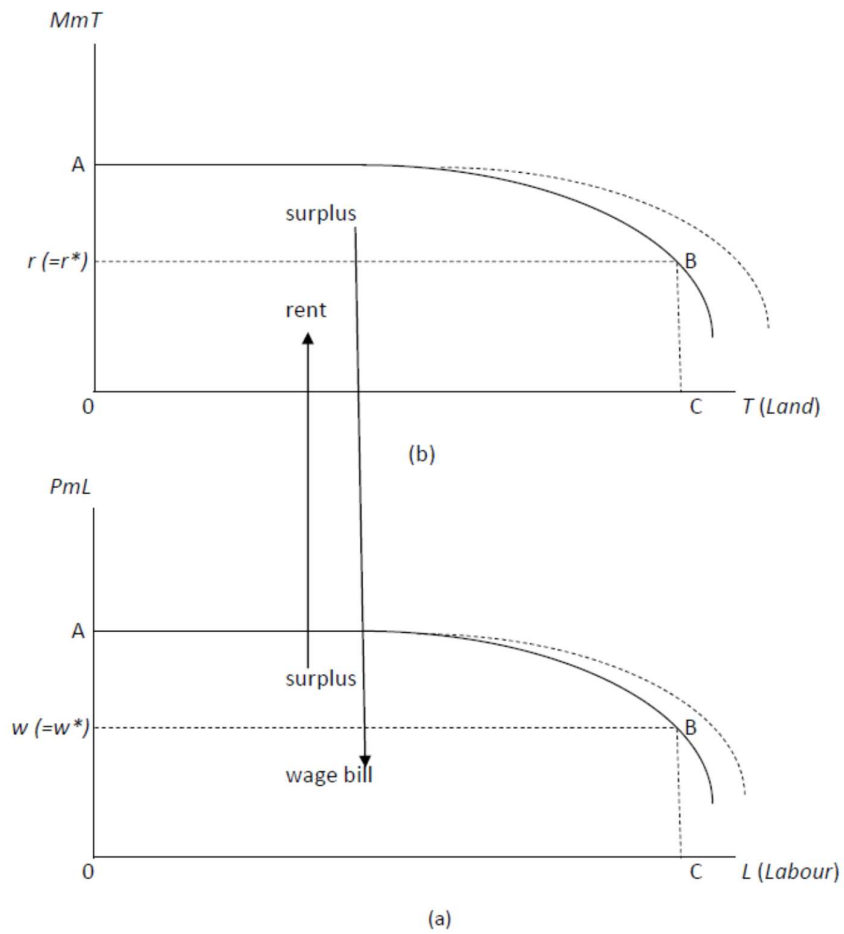


Figure 5

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