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ABSOLUTE RENT AND THE 'NORMAL PRICE' OF EXHAUSTIBLE RESOURCES

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Absolute rent and the 'normal price' of exhaustible resources

Marco Piccioni
Fabio Ravagnani*

1. Introduction

This paper deals with the price paid for the use of exhaustible resources (royalty). After showing that formal determination of royalties based on Ricardian rent is problematic within the classical theory of normal prices (Section 2), we go on to explore a line of analysis founded on Marx's treatment of a different kind of rent on non-producible resources, which he labels 'absolute rent'.

From Marx's general discussion of absolute rent we single out the insights that seem most relevant for the study of royalties. Section 3 examines Marx's view that absolute rent is generated as part of the fundamental institutional arrangements that are required for the orderly functioning of an economy based on wage labour and division of labour. Section 4 points out that Marx analyses changes in absolute rent by examining the circumstances that may persistently alter the relative bargaining position of owners of non-producible resources and 'capitalists'. In this connection, he provides a classification of the forces that may

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influence this relative position according to the historical, social and institutional particularities of each concrete situation.

The determination of absolute rent on exhaustible resources (royalty) that emerges from our account of Marx's analysis is separate from the determination of production prices. This point is further discussed in Section 5, also on the basis of the analogy that Marx himself draws between his treatment of absolute rent and A. Smith's analysis of wages. In view of this analogy, we argue that the separate determination of royalties suggested by Marx can be inserted into the logical structure of the surplus approach in the same way as the determination of wages.

The insights derived from Marx are then illustrated and given more definite content in Section 6, where the analysis of royalties based on the notion of absolute rent is tested against a relevant empirical case, namely the historical evolution of royalties on Middle East oil. We find that Marx's view of a royalty regulated by social and institutional forces is essentially confirmed, and also that his broad classification of the main factors influencing absolute rent proves quite useful with a view to explaining the observed pattern of the royalty.

Finally, the concluding section compares the separate determination of royalties outlined in the paper with the formal determination put forward in recent contributions developed along classical lines.

2. *The specific problem with exhaustible resources*

The specific problem that exhaustible natural resources create in the context of the classical theory of normal prices can be illustrated by focusing on a simplified example.

Consider an economy in which n distinct commodities are produced in yearly cycles and make the following assumptions. First, the set of means of production employed includes a single natural resource that is removable from the ground at negligible cost. Second, the resource is 'exhaustible', i.e. the stock of the resource available in the system cannot be significantly increased by the spontaneous forces of nature, but can be progressively depleted by removing parts of it for productive purposes.

Third, the resource enters into production processes as a circulating capital good while maintaining all of its physical properties over time if it is not used in production. Fourth, the existing deposits of the resource are private property. Fifth, the following conditions obtain in the economy over the time interval under consideration:

(a) the produced quantity of each commodity remains fairly stable, with mild fluctuations around a definite central level;
(b) in each industry, a single production method is known and constantly adopted;
(c) the basket of goods that constitutes the real wage rate also remains fairly stable;
(d) the exhaustible resource is *overabundant,* in the sense that, at the beginning of each cycle, the available quantity of the resource continues to exceed that required by the whole productive sector.

Now imagine that we wish to determine the 'normal position' of the economy under the circumstances just listed. It is clear that we could easily identify the appropriate specification of the 'independent variables', i.e. the normal outputs, the normal wage rate and the dominant production methods. A difficulty would arise, however, as regards the determination of the normal price of the exhaustible resource (royalty) in terms of any produced commodity. Indeed, if the resource had 'indestructible powers', i.e. if it re-emerged intact from production processes, one might argue along the same line as Ricardo and conclude, in view of assumption (d), that competition among owners will make its price tend to zero. As the resource is completely used up once it is employed in production, however, it is doubtful that competitive bidding on the part of owners would generally drive its price towards zero. Why should a generic owner be willing to sell in the present at an arbitrarily low price, if there is the possibility that in the future the repetition of production processes will make the resource 'scarce' and therefore susceptible of being sold at a considerably higher price?[1]

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[1] A precise argument can be put forward to show that the price of an overabundant exhaustible resource will generally be 'bounded away from zero' under competitive

It therefore appears that only a limited conclusion can be drawn on the basis of the 'data' of classical theory and the assumption of unrestricted atomistic competition, i.e. that the price of an overabundant exhaustible resource may well tend to *some* strictly positive level. In turn, the impossibility of reaching more definite formal results on that basis suggests that an analysis of royalties may be needed that does not simply rely on logical deduction. In the following sections we shall argue that basic elements of that analysis can be found in Marx's treatment of a particular kind of rent.

3. *An introduction to Marx's 'absolute rent'. A fundamental aspect of an economy based on wage-labour and division of labour*

Marx criticizes Ricardo's claim that the rent on land, as well as the rent on mines, 'is always the difference between the produce obtained by the employment of two equal quantities of capital and labour' (Ricardo [1821], Ch. II, p. 71), so that only differential rent should be considered. According to Marx, a second kind of rent will normally be paid on non-producible resources, which is not mechanically 'derived from any difference in fertility' and which he calls 'absolute rent'.[2] This kind of rent, which is distinct from both extensive and intensive Ricardian rent, is similar to a 'tax', or 'tribute', that the owners of non-producible resources levy on capitalists' profits (Marx [1894], Ch. XXXVII, p. 610).[3]

conditions. We need only assume that the generic owner realizes that, with the repetition of production processes, at *some* future date the available quantity of the resource *may* become lower than (equal to) that required by the productive sector, thereby allowing the agents who own the resource at that date to reap a positive (and presumably high) price. If the current price for the resource were to be set at zero, any rational owner would leave himself the possibility of being one of the suppliers of the resource at that future date, and would accordingly store his whole endowment of the resource. The total supply of the resource would thus amount to zero, and the resulting excess demand would raise the current price to a positive level. (Note that the argument does not require *definite* expectations about the date of exhaustion).

[2] Marx [1894], Ch. XLV, pp. 739, 742. For a critique to Ricardo's statement that the overabundance of land or of mines necessarily implies a tendency to a zero rent ([1821], Ch. II, p. 69; Ch. III, p. 85), cf. Marx [1862-63], Ch. XIII, §§ 1 and 5.

[3] Hints at a notion of absolute rent can also be found in other authors, *e.g.* Smith [1776], I.xi.a.1-5; Hopkins (1828), p. 30, quoted in Marx [1862-63], Ch. IX, p. 136.

In this Section, we shall point out that, in Marx's views, the *formation* of absolute rent is intimately linked to the orderly functioning of a capitalist economy. In Section 4, we shall see how *changes* in absolute rent are analysed by examining the relative bargaining position of capitalists and owners of non-producible resources. As Marx notes that absolute rent can be studied independently of Ricardian rent, we shall assume zero differential rents from now on for the sake of simplicity.[4]

A central element of Marx's analysis is the view that absolute rent is generated as a fundamental part of the social and institutional arrangements required for the orderly functioning of an economy based on wage labour and division of labour. Marx's analysis refers to non-producible resources in general, including both land *and* exhaustible resources.[5] Here we shall draw from that broader discussion the insights that appear particularly useful for the study of exhaustible resources.

Marx stresses the role of the ownership of non-producible resources in the creation of the markets – for wage labour and other commodities – that are required in order to provide the capitalist production system with sufficiently steady and large flows of commodities. The study of this role will provide us with our first insight into the social and institutional forces conditioning the owners of exhaustible resources and their relations with the other classes.

Marx sees the market for wage labour as the most important for a capitalist economy and absolute rent as an essential requirement for the existence of that market:

> '[I]f the land were so easily available, at everyone's free disposal, then a principal element for the formation of capital would be missing. A most important condition of production and — apart from man himself and his

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[4] By introducing this simplifying assumption, we are not suggesting that Marx's analysis of absolute rent is alternative to the analysis of differential rent. Indeed, Marx explicitly states that the two forms of rent are mutually compatible and may well co-exist ([1894], Ch. XLV, pp. 730-1).

[5] Marx stresses that his treatment of absolute rent is the same 'for agricultural land, building lots, mines, fishing grounds, or forests etc.' and states that 'for the purposes of our analysis [of that rent]' 'instead of agriculture, we can use mining because the laws are the same for both' ([1894], Ch. XXXVII, pp. 606, 601).

> labour — the only original condition of production could not be disposed of, could not be appropriated. It could not thus confront the worker as someone else's property and make him into a wage-labourer. [...] And this would put an end to capitalist production altogether.' ([1862-63], Ch. VIII, § 3c, pp. 43-44)

In other words, without an 'absolute rent' being imposed even on overabundant resources, workers could use those resources to produce their own necessaries and would not be forced to sell their labour services for a wage. As a result, the 'social dependence of the labourer on the capitalist' (Marx [1867], Ch. XXXIII, p. 769) that allows the latter to extract a surplus from production would not exist. From this point of view, it is the capitalist economy itself that requires sufficient 'solidarity' among owners of non-producible resources so that their common action can lead to the imposition of an absolute rent.[6] In more general terms, we can say that, in Marx, absolute rent is an institutional instrument that generates exclusion from access to resources, so as to contribute to the creation of social dependence.

The above argument seems applicable not only to the economies of Marx's time, but also to modern economies. For instance, one could explain the Italian government's reaction in the 1940s to the occupation of untilled land in Southern Italy (cf. Ginsborg, 1989, Ch. 4) in terms of the theory of absolute rent. That land had in fact been previously withdrawn

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[66] In Europe, absolute rent was introduced by means of gradual transformation of social and institutional arrangements, in the course of the historical process that led from feudal to capitalist economies. For the aspects that are relevant here, that process consisted in 'divorcing the producer from the means of production', in order to generate 'free labourers, in the double sense that neither they themselves form part and parcel of the means of production, [...] nor do the means of production belong to them' (Marx [1867], Ch. XXVI, p. 714). In this respect, 'the expropriation of the agricultural producer, of the peasant, from the soil, is the basis of the whole process' (*ibid.*, p. 716). Those expropriations, operated through the so called 'enclosures', often required violent action on the part of landowners that was favoured by their institutional connections ([1867], Ch. XXVII; cf. also Hobsbawm, 1968, pp. 99-105). Capitalists did not oppose those developments. In fact, if on the one hand they suffered an immediate loss from the formation of absolute rent, on the other hand they derived decisive advantages from the possibility to hold larger leaseholds, and above all from the the mass of workers that, expelled from land, went to increase the 'industrial reserve army'. As industrial development unfolded, the historical process leading to absolute rent grew stronger and stronger.

from market precisely in order to create the conditions needed to impose an absolute rent. In turn, the formation of this rent excluded Southern workers from the use of land and promoted the migration towards factories in the North that contributed to the industrial growth of the country in the 1950s and 1960s. Considered in this light, the government's violent reaction (the Melissa massacre) appears to be by no means accidental, but rather shows that the formation of absolute rent is essential for the general functioning of the economy.

These insights derived from Marx can be extended to a system of international relations, in which the leading country seeks to secure control of non-producible resources for itself. In this framework, absolute rent can be seen as one of the institutional instruments that the leading country introduces in order to exclude other countries from access to resources and ensure their dependence on itself (cf. Section 6 for the control exerted by the USA on oil sources).

The function of absolute rent clearly emerges in the case of a colony rich in non-producible resources that have not yet been appropriated. Without property on those resources, the formation of an absolute rent is inhibited, and this 'prevents the existence of a class of labourers for hire' (Wakefield, 1833, Bk. I, p. 17; quoted in Marx [1867], Ch. XXXIII, p. 767).[7]

Marx adds that the possibility the workers have to use non-appropriated resources to produce their own necessaries also entails an insufficient division of labour. This is so because of insufficient 'destruction of the household industry of the peasantry', which prevents the 'separation of agriculture from industry' ([1867], Ch. XXXIII, p. 768). More generally, lack of absolute rent prevents the formation of a network of markets

[7] We may also note that the case of the colony is partly similar to cases in which new deposits of an exhaustible resource are discovered (or a new use is discovered for a resource already known). In those cases an initial phase may occur in which, to paraphrase Marx ([1862-63], Ch. XIII, § 1), those who initially appropriate new deposits of the resource cannot exclude others from appropriating further new deposits. The oil fields in the USA in the 1850s may have been in a similar situation. The frequent discovery of new oil fields seems to confirm this conjecture. The common practice of draining oil from adjacent wells had similar effects (cf. Haigh and McLean, 1954, p. 59).

endowed with 'that extension and consistence which the capitalist mode of production requires', and capable of providing the steady flow of commodities essential to production, such as inputs from land or mines[8] (cf. Section 6 for the case of oil). Moreover, Marx points out that, in the absence of absolute rent, industry would also lack sufficiently large and steady markets for its outputs.

When the lack of absolute rent brings about the above-mentioned 'inconveniences' to capitalist production, Marx argues, it often happens that governments intervene by directly imposing an absolute rent[9] (for an instructive example involving exhaustible resources, cf. Section 6 below) or by fostering 'a most rapid centralisation' in the property of non-producible resources.[10] In the latter case, on the one hand resource owners are reduced in number, and on the other, they are frequently selected on the basis of their special relationship with the government, which also implies connections *among* the owners themselves. Both these factors favour common action on the part of owners aimed at imposing or increasing absolute rent.[11]

From the foregoing account it emerges that, in Marx's view, the individual ownership of non-producible resources, in its role as a tool for levying absolute rent, is created within a suitable institutional framework. This view is in agreement with the basic features of the surplus approach,

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[8] [1867], Ch. XXX, pp. 747-8.

[9] This form of intervention was recommended by Wakefield (1833, Bk. II, p. 192; quoted in Marx [1867], Ch. XXXIII, p. 772). The English government tried to apply his suggestions to colonies, for instance by means of the 'Ripon Regulations' (1831) and the 'Act establishing the new colony of South Australia' (1834): cf. de Vivo (2000), p. ix, xv.

[10] Marx [1867], Ch. XXXIII, p. 773.

[11] State intervention may centralize even more effectively the appropriation of non-producible resources, as Marx exemplifies for the case of land:

> '[T]he purpose is completely fulfilled if [land] becomes state-property, i.e., if the state draws the rent. [...] The radical bourgeois [...] therefore goes forward theoretically to a refutation of the private ownership of the land, which, in the form of state property, he would like to turn into the common property of the bourgeois class, of capital. But in practice he lacks the courage, since an attack on one form of property – a form of the private ownership of a condition of labour – might cast considerable doubts on the other form. Besides, the bourgeois has himself become an owner of land.' ([1862-63], Ch. VIII, § 3.c, pp. 44-5).

where the individual is conceived of as situated in an 'institutional environment' that endows him with 'propensities and codes of conduct that befit him to maintain the social state' (Bharadwaj, 1989, pp. 15-16). Thus, for instance, the formation of 'esprit de corps' within the class of resource owners can influence the behaviour of the individual owner through customs or social sanctions. Social conditioning can also extend its influence to the formation of the individual's aims and preferences.[12] On the other hand, the formation of 'esprit de corps' leading to common action on the part of owners will not be opposed by capitalists, to the extent that it contributes to the orderly functioning of the production system as a whole.

It must therefore be stressed that the above-mentioned social and institutional conditioning is not an 'imperfection' of the market, a particular deviation from the benchmark case of competition as conceived in marginalist theory.[13] Rather, we are dealing here with basic requirements without which the orderly functioning of market economies – and therefore competition itself – could not be brought into existence and maintained. In Marx, the analysis of absolute rent is connected to general and fundamental relations between classes, and is accordingly different from the traditional analysis of oligopolies seen as 'imperfections'.

4. *A second aspect in the analysis of absolute rent: the conflict between owners of non-producible resources and capitalists*

We have seen that owners of non-producible resources and capitalists have converging interests in the *formation* of absolute rent, as the existence of that rent is a necessary condition for the extraction of a surplus in production. When we come to study *changes* in absolute rent, however, it is the conflict between the two classes over the distribution of the surplus that becomes the relevant aspect.

[12] Cf. Gramsci on the Junkers' 'esprit de corps' ([1929-35], pp. 1526-7, 2032-3). Cf. also Levrero (1998, Section III) on the influence of social conditioning on the aims and preferences of the individual.

[13] Cf., for example, Solow (1974), p. 13.

In order to study that conflict, it is advisable first to clarify the relationship between absolute rent (α) and the rate of profits (r), under the simplifying assumption of wages equal to necessaries. We can attribute to Marx the following relationship between the two variables: when absolute rent increases, the share of surplus value to be distributed as uniform profits decreases (cf. [1894], Ch. XLV, p. 744). We accordingly have:

$$r = \frac{s-\alpha}{c+v}$$

where s is the surplus value and c, v respectively denote constant and variable capital.[14]

If we now refer to Sraffa's correct analysis, in which the rate of profits is to be determined simultaneously with prices, we can use a simple extension of the price equations, with workers' necessaries included in the technical coefficients and the 'standard net product' as numeraire, to obtain:

$$r = \frac{1-\alpha}{\frac{1}{R}}$$

where R is Sraffa's 'standard ratio' and $1/R$ is the value of capital in the 'standard system'.[15]

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[14] Marx also gives a particular example designed to show that the presence of absolute rent is compatible with a uniform profit rate. He considers an economy with only two sectors, 'agriculture' and 'industry', and assumes that the organic composition of capital is lower in the former sector. With prices equal to 'values', and in the absence of absolute rent, agricultural production would give a higher profit rate. But if those 'excess profits' are appropriated by landowners as absolute rent, Marx argues, the residual part of the social surplus value can be allocated according to the 'rule of capital' so as to generate a uniform rate of profits in the two sectors. In the context of this illustrative example, absolute rent is therefore seen by Marx as 'excess profits' ([1862-63], Ch. VIII), an expression that occasionally re-appears in other parts of his discussion.

[15] Let A be the matrix of technical coefficients relating to inputs of capital goods (including workers' necessaries), $\boldsymbol{t}$ the vector of coefficients relating to inputs of 'deposits' of the single exhaustible resource used in production, $\boldsymbol{q}^*$ the standard commodity vector. From:

In both formulations we can see that an increase in absolute rent reduces the rate of profits.

We must now consider how the use of non-producible resources typically involves, as Marx shows in the case of land, 'all three classes — wage-labourers, industrial capitalists, and landowners constituting together, and in their *mutual opposition*, the framework of modern society' ([1894], Ch. XXXVII, p. 604; emphasis added). In particular, the conflict between resource owners and capitalists is described as follows:

> 'The essence of absolute rent [...] consists in this: [...] the rent [...] forms a portion of the value, or, more specifically, surplus-value, of commodities, and instead of falling into the lap of the capitalists, *who have extracted it from their labourers*, it falls to the share of the landlords, *who extract it from the capitalists*.' (*ibid.*, Ch. XLV, p. 753; emphases added)

In the above quotation, an important parallel emerges between the bargaining over wages and the bargaining over absolute rent. The parallel is even more neatly formulated in the following passage, where an ideal resource owner addresses an ideal capitalist:

> 'Just as your ownership of one condition of production — capital, materialised labour — enables you to appropriate a certain quantity of unpaid labour from the workers, so my ownership of the other condition of production, the land, etc., enables me to intercept and divert away from you

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$$Ap(1+r) + t\alpha = p \quad \text{(price equations)}$$
$$q^*A(1+R) = q^* \quad \text{(determination of the standard commodity)}$$

we obtain:

$$q^*Apr + q^*t\alpha = q^*p - q^*Ap$$

and since $q^*Ap = 1/R$, $q^*p - q^*Ap = 1$, by taking q^*t as the physical unit of the resource ($q^*t \equiv 1$) we finally have

$$\frac{1}{R}r + \alpha = 1$$

Cf. also Schefold (1989), Ch. 20a, pp. 242-3.

and the entire capitalist class, that part of unpaid labour which is excessive to your average profit. [...] Can you manufacture land or water or mines or coal pits? Certainly not. The means of compulsion which can be applied to you in order to make you release again a part of the surplus-labour you have managed to get hold of does not exist for me. [...] The only thing your brother capitalists can do is to compete against you, not against me. If you pay me less excess profit than the difference between the surplus-time you have made and the quota of surplus-labour due to you according to the rule of capital, your brother capitalists will appear on the scene and by their competition will force you to pay me fairly the full amount I have the power to squeeze out of you.' (Marx [1862-63], Ch. VIII, pp. 41-2)[16]

The analogy ('just as your ownership...so my ownership') that Marx draws between the bargaining over wages, where workers are directly opposed to capitalists, and the bargaining over absolute rent, where capitalists are directly opposed to owners of non-producible resources, highlights the importance of social and institutional factors in the determination of both distributive variables. In particular, Marx is suggesting that changes in absolute rent, like those in wages, originate from changes in the relative bargaining position of the classes involved in the conflict: absolute rent is in fact seen as the 'amount' that the owners of resources are 'empowered to squeeze' from capitalists.

A further interesting point in the second passage quoted above is the view of how competition works in the sphere of non-producible resources. Marx wonders why resource owners are not forced by competition to release the absolute rent they have secured. His answer is that when owners and capitalists act as distinct classes, competition within each class will be limited by the internal unity or solidarity of the class itself. Internal unity is therefore one of the factors that will influence the bargaining position of each class (cf. Section 6 for instances of the role of this factor).[17]

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[16] Note that land and exhaustible resources ('mines', 'coal pits', etc.) enter Marx's analysis of absolute rent in the same way (cf. above, n. 5).

[17] Although Marx emphasises the distinction between capitalists and owners of resources that cannot be 'manufactured', his analysis also appears applicable to the case where resources are appropriated by a group of capitalists and no independent class of resource owners exists. In this case, we could still distinguish between two groups of agents – the first owning capital goods only, the second owning capital goods *and* resources – and

How can the owners of non-producible resources levy a 'tax' on capitalists? This is Marx's explanation:

> 'The mere legal ownership of land does not create any ground-rent for the owner. But it does, indeed, give him the power to withdraw his land from exploitation until economic conditions permit him to utilize it in such a manner as to yield him a surplus [...]. He cannot increase or decrease the absolute magnitude of this sphere, but he can change the quantity of land placed on the market. Hence, [...] it is a characteristic fact that in all civilized countries a comparatively appreciable portion of land always remains uncultivated.' ([1894], Ch. XLV, p. 739)

The power that owners can exert is therefore that of limiting the investment of capitalists in resources:

> 'Landed property is here the barrier which does not permit any new investment of capital in hitherto uncultivated or unrented land without levying a tax, or in other words, without demanding a rent, although the land to be newly brought under cultivation may belong to a category which does not yield any differential rent.' (*ibid.*, pp. 743-4)

Marx also notes that, contrary to the case of Ricardian rent, it is an increase in absolute rent that brings about an increase in the price of 'corn', not the other way round (*ibid.*, pp. 737, 744).

The level of absolute rent, Marx adds, 'will depend wholly on the relation between supply and demand and on the area of land newly taken under cultivation' (*ibid.*, p. 744). In other words, absolute rent will increase when owners' common action withdraws from the market a larger part of the resources. In general, absolute rent is influenced by four factors:

> 'It is limited by additional investments of capital in the old leaseholds, by competition from products of land coming from abroad — assuming their import is unrestricted — by competition among the landlords themselves, and finally by the needs of the consumers and their ability to pay.' (*ibid.*, pp. 739-40)

Let us consider the first factor, the role of 'additional investments of capital in the old leaseholds'. By means of those investments, capitalists

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argue that sufficient solidarity within the latter group may still lead to the formation of absolute rent. For the case in which the state owns the resources, cf. n. 11 above.

can avoid the 'barrier' due to the ownership of non-producible resources: an increased possibility for capitalists to implement those investments reduces the bargaining power of owners and, therefore, absolute rent. In this connection, some differences may arise between land proper and exhaustible resources. In actual fact, the possibility of investing additional capital in an old mine finds a limit in the exhaustion of the mine itself. Moreover, the prevailing customs may impose 'leases' prescribing limits to the quantity of mineral the leaseholder is allowed to extract.

The second factor is international trade. This can influence the relative bargaining position of the classes when buyers find new international sellers, or sellers find new buyers on international markets, or when barriers to trade are raised or abandoned.

The third factor is the working of competition among the owners of resources (or among capitalists). In this connection, as pointed out above, further developments of the analysis should be directed to investigating in more depth the formation of 'esprit de corps' within classes and to gathering more concrete details on the social and institutional arrangements influencing each individual member of the class. Moreover, in the case of exhaustible resources, we should also take into account the possibility that depletion of some deposits may reduce competition among owners.

Finally we have changes in 'the needs of the consumers and their ability to pay', i.e. changes in the level of 'effectual demand'. A further difference between land proper and exhaustible resources can be identified here. While changes in the output of 'corn' largely depend on accumulation and population growth, the production of minerals is more closely related to technical innovation and restructuring of productive systems.

5. *Some basic features of the analysis presented*

From the above account of Marx's analysis, we can derive a determination of the absolute rent on exhaustible resources (royalty) that is *separate* from that of prices. As is well known, separation into two distinct levels of analysis is a peculiar feature of the surplus approach, and is justified in the case of royalties by the difference existing between price equations and the

kind of relations considered in the study of absolute rent. Price equations are in fact based on a definite logical necessity (once a uniform rate of profits has been assumed) and endowed with significant and general quantitative properties. Conversely, Marx's treatment of absolute rent leads, on the one hand, to an *assessment* of the general relations of mutual influence between resource owners and capitalists (that highlights the essential role played by the institutional regulation of non-producible resources within a capitalist economy), and on the other, to a *classification* of the social and institutional forces that may foster changes in absolute rent according to the particularities of each concrete situation (cf. the four factors mentioned at the end of the previous section). In this way, a 'non-mechanical'[18] analysis emerges that is in line with the considerations put forward in Section 2. There, lack of a necessary tendency to a definite price for 'overabundant' exhaustible resources led us to explore an analysis of royalties that does not merely rely on logical deduction.

We have also noted that Marx draws an explicit parallel between the determination of absolute rent and that of wages on the grounds that both distributive variables are influenced by the relative strength of the classes involved. This similarity can be seen quite clearly if we consider A. Smith's description of the bargaining over wages:

> 'What are the common wages of labour depends every where upon the contract usually made between those two parties, whose interests are by no means the same. [...] The [workmen] are disposed to combine in order to raise, the [masters] in order to lower the wages of labour.' ([1776], I.viii.11)
>
> 'Masters are always and every where in a sort of tacit, but constant and uniform combination, not to raise the wages of labour above their actual rate. To violate this combination is every where a most unpopular action, and a sort of reproach to a master among his neighbours and equals. [...] Such combinations, however, are frequently resisted by a contrary defensive combination of the workmen[.]' (*ibid.*, I.viii.13)

In the above passages we see that wages, like absolute rent, are taken to be influenced by the bargaining position of two competing parties. Moreover,

[18] This term is borrowed from a letter by Sraffa, quoted in Pivetti (2000, p. 304).

the bargaining strength of 'workers' or 'masters' — not differently from that of resource owners — may derive from 'combinations' disciplined by social sanctions ('reproach') or from other social and institutional factors (for example, from 'the interposition of the civil magistrate': cf. Smith [1776], I.viii.13).[19] In view of this analogy between the two distributive variables, Marx's analysis of absolute rent can be inserted into the logical structure of the surplus approach in the same way as the analysis of wages.[20]

6. *Testing Marx's analysis of the price of exhaustible resources*

In this section, the analysis of the price of exhaustible resources based on Marx's notion of absolute rent will be tested against a relevant empirical case, i.e. the evolution of the royalty in the Middle Eastern oil-producing countries from the second half of the 1930s (when extraction began to spread throughout the region) to the first half of the 1970s (when the distinction between the owners of oil fields and the 'capitalists' operating them began to vanish).

We can begin by pointing out that, in many applied studies of the oil industry in the period and area under consideration, the evolution of the royalty is analysed from a viewpoint that is compatible with that of Marx.

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[19] It should also be noted that, in both the case of wages and that of absolute rent, positive levels of the distributive variable are not necessarily associated to full employment of labour or non-producible resources. As is well known, Smith argues that, even when wages are low, 'many would not be able to find employment even upon these hard terms' ([1776], I.viii.26). Here competition, conceived of as acting under social and institutional conditioning, does not entail an indefinite fall of wages in the presence of labour unemployment. This is the same as what happens to absolute rent when non-producible resources are overabundant.

[20] We are not, of course, claiming that there are no differences between the analysis of wages and the analysis of absolute rent. For example, a difference may be seen in that large wage reductions (say, to a level below subsistence) can upset the orderly functioning of productive processes for reasons opposite to those that arise in consequence of large reductions in absolute rent. In the first case, social instability can derive from 'the perpetration [...] of the greatest enormities' (Smith [1776], I.viii.26) to which workers may be driven when they even lack necessaries. In the second, social instability can derive from the reduced 'social dependence' of the labourers on capitalists.

Indeed, the observed pattern of the royalty is commonly explained as the outcome of a prolonged struggle for appropriation of the profits from oil extraction, which involved a small group of Western companies on one side and the legal owners of the resource — i.e. the local governments — on the other (cf., for example, Issawi and Yeganeh, 1962; Mikdashi, 1966; Luciani, 1976; Rustow and Mugno, 1976; Roncaglia, 1985).[21] It must also be recalled that oil companies were bound by a collusive agreement — tolerated by Western authorities and, from the early fifties, reinforced by the protectionist energy policy of the USA — that enabled them to keep the price of Middle Eastern crude oil constantly much higher than production costs.[22] In the case under examination, the conflict between the owners of the exhaustible resource and the 'capitalists' of the corresponding extraction industry thus concerned the sharing of *oligopoly* profits, whose total amount was largely influenced by external political forces. Given these premises, we shall now briefly review the historical evolution of the royalty. It will appear that the main changes in that distributive variable can be imputed to circumstances that fit in quite well with Marx's classification of the factors affecting absolute rent.

We shall outline four successive stages in the pattern of the royalty. In the first (1935-48), the allocation of profits from oil extraction essentially reflected the persistent bargaining advantage of the cartel of companies with respect to local governments. In the second (1948-60), the requirements of orderly post-war recovery under the leadership of the United States fostered a substantial and lasting increase in the profit share accruing to producing countries. In the third (1960-70), the formation of a collective organization of those countries only entailed moderate increase in the royalty, as the bargaining power of the organization was limited by the conflicting interests of its members. In the last stage (1970-75), a

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[21] It should be noted that in Roncaglia (1985, pp. 29, 32) the royalty on oil is explicitly related to Marx's concept of absolute rent.

[22] The companies' policy was to keep the price of Middle Eastern oil in line with that of American crude, whose production costs were, however, much higher. This oligopolistic practice was compatible with American laws, which do not forbid the formation of cartels *outside* USA. Moreover, it was consistent with the protection of small oil producers in America, and of the coal industry in Europe and Japan.

composite set of circumstances improved the cohesion of producing countries, and eventually led to complete appropriation of profits by the governments of those nations. Let us now examine each stage in some detail.

The first stage (1935-48). In the mid-1930s, Middle Eastern oil fields were operated by a restricted number of foreign companies (mostly based in the USA) under a regime of long-term *concessions* from the governments of host nations. Those concessions allowed companies to freely determine both the quantity to be extracted and the price of crude oil. In exchange, governments were entitled to a fixed royalty per ton of oil sold, that was typically set at the rate of four shillings gold (Mikdashi, 1966, Ch. 3).

As mentioned above, companies were bound by a pact for joint management of extraction in the various Middle Eastern countries. Concessions were accordingly run by *production consortia*, in which the different companies participated on the basis of a system of quotas carefully planned over the whole region. As Roncaglia (1985, p. 54) points out:

> '[the] organisational structure [...] based on joint participation in production consortia [...] constitutes an institutional framework conducive to co-ordination of the activities of major companies jointly interested in Middle East oil. The rules determining the quantity of crude oil to be lifted yearly, and the shares of each member in the consortium's oil, are highly complex and vary from country to country. They all have, however, the same ultimate target: the balancing of the conflicting interests of 'crude long' companies, i.e. those with abundance of their own crude production, compared with their refining and distribution capacity, and of 'crude short' companies. *The object of this balancing exercise is to limit supply so as to bring it into line with demand, and thus avoid downward pressures on prices*' (emphasis added)

It must be stressed that, in the course of their settlement, oil companies devised a variety of measures aimed at securing a lasting advantage in bargaining with governments. In order to limit access to potential competitors, they secured the condition that their own concessions were to cover vast areas surrounding the specific sites in which exploration seemed

promising (Issawi and Yeganeh, 1962, pp. 93-94). They also located refineries outside the Middle East in order to reduce the risk of nationalization (Tanzer, 1969, p. 136). The strategic expedient adopted was, however, to build extraction plants endowed with considerable *excess capacity*, which enabled the companies to reduce production in any country that might cause trouble and to offset this immediately by intensifying extraction in more 'docile' nations. (We will shortly see that this form of retaliation was actually put into effect on a crucial occasion). For the purpose of our discussion, it is interesting to note that a natural parallel can be drawn between the ability of oil companies to increase production in any one country — given the terms of the concessions and the size of plants — and the power of implementing 'additional investments in the old leaseholds' that Marx emphasized as a factor limiting absolute rent.

As a result of the companies' greater bargaining strength, the terms of the concessions did not change appreciably until the late 1940s.[23] In particular, the royalty per ton received by host nations, expressed in gold, remained fixed at the original level in spite of the steady rise in the companies' profits (Mikdashi, 1966, p. 135).

The second stage (1948-1960). After World War II the demand for oil grew very rapidly on international markets, due to both the general expansion of Western economies and the steady substitution of fuel oil for coal in Europe and Japan. In turn, the rise in demand created a pressing need for oil sources outside the USA,[24] and for the most developed countries it became essential to secure adequate oil provision from Middle East. It was in this situation that an initiative was taken by the nation at the head of the post-war recovery to reshape the economic relations between the oil companies and Middle Eastern governments. In 1949, the U.S. government approved a fiscal measure allowing firms to claim income taxes paid abroad as full credits against federal taxes on foreign operations. This new regime enabled American oil companies to expand and stabilize their activity in the Middle East, as they could then afford to pay a

[23] On the producing countries' unsuccessful attempts at re-negotiating concessions in this stage, cf. Rustow and Mugno (1976, p. 4).

[24] It should be noted that the USA has been a *net importer* of crude oil since 1948.

considerably higher royalty to local governments, *in the form of income tax*, without impairing their own net profits. An initial agreement in this sense was reached at the end of 1950 with the country owning the largest oil reserves, namely Saudi Arabia. Under the new arrangements, the fixed royalty per ton was replaced by a 50% tax on the companies' profits, to be calculated on the basis of the price for crude oil officially quoted by the companies themselves (*posted price*). Analogous 'fifty-fifty agreements' were stipulated shortly afterwards with Kuwait (1951) and Iraq (1952).

The immediate effect of the fifty-fifty profit sharing was that of approximately doubling the governments' receipts per unit of oil produced (cf. Issawi and Yeganeh, 1962, p. 114, Table 34). But why did the USA decide to prompt such a considerable increase in royalties? As the following quotation explains, it basically was a political move aimed at guaranteeing a regular oil flow from Middle East under the U.S. control:

> '[...] the foreign tax credit was an instrument of US foreign policy. US foreign policy objectives were threefold. First, the US desired to provide a steady supply of oil to Europe and Japan at reasonable prices [...] Second, the US desired to maintain stable governments in the non-Communist pro-Western, oil exporting countries. Third, the US desired that American-based firms be a dominant force in world oil trade' (U.S. Senate, 1975, p. 2; quoted in Roncaglia, 1985, p. 102)

The reallocation of profits offered to producing countries after World War II thus appears to confirm a basic insight of Marx, i.e. that absolute rent is 'politically' regulated as part of the institutional arrangements aimed at ensuring the orderly functioning of the economic system. Moreover, the events of the early fifties show quite explicitly that the relative strength of 'owners' and 'capitalists' plays a key role in that regulation. In this connection we can cite the case of the 'rebel' country Iran, which nationalized the plants controlled by the Anglo-Iranian Petroleum Company (British Petroleum) in 1951. As is well known, the cartel of companies reacted by boycotting Iranian oil and increasing extraction in Iraq and Kuwait, thereby engendering a deterioration of economic conditions in Iran that eventually forced the local government to accept a 'fifty-fifty agreement' (1954).

The defeat of Iran, which clearly revealed the cohesion of companies and the absence of solidarity among producing countries in the stage under examination, had a powerful deterrent effect on local governments. Moreover, stability in the relationships between governments and their concessionaires was favoured throughout the 1950s by the upward tendency of the profits from extraction, which automatically extended by virtue of the new agreements to the producing countries' receipts per unit of crude oil. It was only at the end of the decade that the inflow of Russian crude onto world markets, as well as the expansion of independent competitors in oil industry, forced major companies to cut the 'posted prices' that served as the base for calculating their taxable income. This caused a significant fall in the royalty that affected all producing countries indiscriminately.

The third stage (1960-1970). The generalized fall in posted prices provided a powerful incentive for co-ordinated reaction on the part of producing countries, and indeed favoured the birth of OPEC in 1960 (Stocking, 1970, p. 403). The organization identified as immediate targets an active role of host nations in the setting of posted prices and a higher tax rate on the companies' profits. After long negotiations, however, a disappointing agreement was reached in 1964 that only provided for moderate increase in the governments' receipts (Mikdashi, 1972, pp. 142-43; Luciani, 1976, pp. 36-37). And aside from stabilization of posted prices — and therefore of the royalty — no further improvement was achieved in the sixties.

According to most commentators, the cause of OPEC's failure in the early years of its life can be traced back to the conflicting interests of its members. Indeed, it was clear to all producing countries that successful negotiation required a weakening of the companies' main weapon — the power to shift extraction from one country to another — and that this result could only be attained by allocating rigid production quotas among OPEC nations (Lutfi, 1968, pp. 67-68; Luciani, 1976, p. 38). Nevertheless, no effective agreement on quotas could ever be reached.[25] The reason is that

[25] A system of quotas was officially introduced in 1965, but Saudi Arabia and Libya rendered it ineffective by allowing companies to exceed prescribed extraction levels.

the nations with larger oil reserves and little opportunity for domestic investment (e.g. Saudi Arabia) preferred at the time to try and maximize extraction in their own territories in order to accumulate foreign currency, thereby entering in conflict with the countries endowed with smaller reserves and better prospects for home investment (such as Iran and Iraq), which were instead more inclined to restrict extraction. In the language of Marx, we can therefore assert that the level of absolute rent was limited throughout the sixties by the lack of cohesion among the owners of the exhaustible resource.

The fourth stage (1970-1975). In the early 1970s, a series of circumstances contributed to an improvement in the producing countries' bargaining position and paved the way for collective action on the part of those nations, which substantially altered their economic relations with the companies in the space of a few years. The main factor coming into play has much to do with 'the needs of the consumers' (effectual demand) mentioned by Marx. In 1970, a break in the pipeline linking the Middle East to the Mediterranean caused serious difficulties for the supply of oil to Europe and forced companies to increase extraction in Libya. In turn, the greater need for Libyan crude was ably exploited by the new local government in order to impose both a marked increase in the price for oil and higher income tax. More importantly, a severe energy shortage in the USA, due to progressive exhaustion of domestic sources, radically changed the oil policy of that nation. The U.S. government cancelled the regime of oil import quotas in force since 1959 in order to meet the immediate requirements of industry, and at the same time promoted an increase in the price of American crude with the aim of stimulating both exploration at home and research into energy sources alternative to oil.[26] The successful implementation of that twofold manoeuvre also clearly required a price increase for oil extracted *outside* the USA (Luciani, 1976, pp. 43-44).

In that favourable situation, OPEC followed Libya's lead and started a new round of negotiations aimed at reaping improvements in both the posted prices and the tax on companies' profits. Under pressure from the

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[26] The anti-trust laws were temporarily suspended for that purpose.

U.S. government, the companies eventually accepted OPEC's requests with the Tehran agreement of 1971, which provided for an immediate 20% increase in posted prices and raised the income tax from 50% to 55%.

The oil companies signed the Tehran agreement in the belief they had negotiated a stable arrangement that would guarantee their access to crude oil and enable companies and governments to coexist in predictable fashion for some years. Contrary to their expectations, however, Tehran did not usher in a period of stability. The dollar depreciation stemming from the abandonment of Bretton Woods monetary regime very soon led to requests of further price adjustments. Moreover, OPEC moved on to claim direct participation of local governments in the ownership of production consortia. An initial participation of 25% was conceded in 1972, with a plan of progressive increases, but only Saudi Arabia and Abu Dhabi accepted it, while Libya and Iraq adopted drastic measures of nationalization. Significantly enough, the major companies hit by those measures tried to react with a boycott, but failed, as they did not obtain the backing of the 'independent' companies operating in the region.

By 1972, several factors thus contributed to an improvement in the cohesion and bargaining power of producing countries. Libya and Iraq's successful action showed that the threat of retaliation on the part of the major companies was no longer credible in a situation characterized by the energy crisis of Western world and the active presence of 'independent' competitors in the oil industry. Moreover, the reserves of foreign currency accumulated over the previous years enabled producing countries to hold out longer in the disputes with companies. Finally, the depreciation of the dollar made the reinvestment of oil proceeds abroad much less attractive than in the past, thereby encouraging *all* producing countries to limit extraction (Luciani, 1976, p. 48). Under these circumstances, a radical shift in the balance of power had become possible.

As is well known, the shift occurred in 1973-4, when the continuing depreciation of the dollar eroded the gains achieved by the producing countries. OPEC and the organization of Persian Gulf nations initially reacted by imposing further adjustments in posted prices, and eventually declared an embargo against the companies based in the USA and The

Netherlands. This drastic measure was actually of limited duration, but gave immense bargaining power to the Middle Eastern governments, which was used to gain control of production consortia. In 1974, the government's share in local consortia reached 60% in Kuwait, Abu Dhabi, Bahrain and Saudi Arabia. By 1975, the share of Saudi Arabia had reached 100%, and nationalization of oil industry had been started or completed in Kuwait and Iraq. Royalty payments thus began to be replaced by the direct appropriation of profits on the part of the owners of the exhaustible resource.

7. *Concluding remarks*

We can now recapitulate the argument of the previous sections and draw some conclusions.

We started by addressing the determination of the normal price of an 'overabundant' exhaustible resource, and pointed out that formal determination along the lines of Ricardian rent is rendered problematic by the fact that the resource does not possess the 'indestructible powers' of land. In particular, we noted that owners will plausibly consider the possibility that the resource in their possession may become 'scarce' at some future point in time, and for this reason competition may well tend to establish a non-negligible positive price. The problem is, however, that the circumstances taken as 'given' in the theory are not sufficient to determine precisely the price that will prevail. The negative conclusion reached for the realistic case of 'overabundant' exhaustible resources then led us to explore an analysis of the royalty, compatible with the structure of the classical approach, which does not merely rely on logical deduction. We thus focused attention on Marx's treatment of royalties as a form of 'absolute rent', whose normal level is to be determined *separately* from the prices of produced commodities, in a way that recalls the classical determination of the wage. We drew basic guidelines for that separate determination from Marx's general discussion of absolute rent. A central insight was that the economic relationships between owners of exhaustible resources and 'capitalists' will normally be regulated by political and

institutional forces in such a way as to guarantee the orderly functioning of the whole system. In this context, Marx also suggests that changes in royalties could be properly analysed by examining the factors that, under the given historical circumstances, may persistently alter the relative bargaining strength of owners and 'capitalists'. Finally we went on to test the separate determination outlined in Marx's writings against a relevant empirical case, the evolution of the royalty on Middle Eastern oil. A review of the available evidence showed that the basic insight of a royalty regulated by political and institutional forces is largely confirmed and that Marx's classification of the factors influencing absolute rent proves quite useful with a view to explaining the main changes in the observed pattern of the royalty.

We shall now comment briefly on the line of analysis and empirical findings presented in this paper. First of all, it must be admitted that reference to a single empirical case is not sufficient in order to assess whether the separate determination of royalties suggested by Marx is susceptible of general application. More extensive study of the historical formation and evolution of royalties will be necessary for adequate evaluation of this point. At the same time, we cannot help noticing that state intervention, or other forms of institutional regulation, are the norm in the extraction industry.

Second, it is interesting to compare the separate analysis of royalties, and the evidence that confers some plausibility to it, with the formal determination put forward in recent contributions developed along classical lines. These contributions focus on the intertemporal path of an economy with a single exhaustible resource and a single produced commodity, and determine the pattern of the royalty in a way that can be summarized as follows. It is first assumed that in a given period — say period t — the resource is about to be exhausted or in any case in short supply, and that for this reason two methods co-exist in the industry of the produced commodity: either a method using the resource combined with another that does not require it (Bidard and Erreygers, 2001), or two distinct methods both using the resource (Parrinello, 2001). Under the postulated co-existence of production methods, the royalty in period t is reckoned

through simple adaptation of the theory of differential rent. The royalty in the periods before (after) t is then determined by appropriately discounting (revaluing) the royalty in t on the basis of the 'dated' profit rates of the intertemporal economy.

This formal determination elicits two considerations. The first is that it is not applicable to the case from which our argument started, and which seems most relevant in practice, i.e. the case of an overabundant resource for which neither a definite date of exhaustion nor conditions of scarcity leading to co-existence of methods are in sight. This limitation supports the view that formal analysis of royalties relying on Ricardian rent is problematic in a classical framework. Our second observation concerns the assumption that the royalty appreciates in each period at rate equal to the ruling profit rate. This assumption is justified on the grounds that revaluation of the royalty is a necessary implication of the competition among the owners of exhaustible resources. Should the royalty be constant over two consecutive 'years' t and $t+1$, it is argued, each owner would have an incentive to supply his whole endowment of the resource in year t, and to invest the proceeds at the going rate of profits (interest), rather than selling in year $t+1$. Competition would accordingly tend to lower the royalty in year t until it equals the discounted value of the royalty in $t+1$. This argument denying the persistence of the royalty is sometimes invoked in order to challenge the applicability of the 'method of normal positions' in the presence of exhaustible resources (cf., for example, Bidard and Erreygers, 2001). We may wonder, however, whether the conditions of unrestricted competition among owners assumed in the logical argument are really dominant in the industries dealing with the extraction of exhaustible resources. Let us return, for example, to the features of oil industry in the Middle East. As leading experts report, the 'institutional structure' based on production consortia, which allowed the steady supply of oil to the developed nations, was such as to prevent effective competitive bidding among the legal owners of the resource. That structure was indeed incompatible with lasting intensification of extraction in a country offering royalty discounts, as it crucially relied on carefully balanced allocation of crude oil production among the various host nations,

which was necessary not only in order to preserve the political stability of the area but also to avoid clashes among the companies themselves (cf. in particular Tanzer, 1969, pp. 62-66). By casting doubt on the assumption of unrestricted competition among owners typical of the formal contributions, the empirical case examined in this paper invites us again to undertake an analysis of the royalty that acknowledges the role of political and institutional forces in the regulation of the interplay between owners of exhaustible resources and 'capitalists'.

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