Nonproduced Means of Production: Neo-Ricardians vs. Fundamentalists

*BILL GIBSON and HADI ESFAHANI**

ABSTRACT: Neo-Ricardian and Fundamentalist theories of rent and landed property are compared within the analytical framework of the Sraffian model with respect to both the question of the static distribution of surplus value and the dynamics of capital accumulation. The general problem of nonproduced means of production is first posed in a way that admits a Fundamentalist as well as Neo-Ricardian solution. It is seen that Sraffians refer to land's scarcity in relation to the level of effective demand as the cornerstone of their theory of rent, while Fundamentalists rely on the political and economic power of the landlord class to close the system of price-and rent-determining equations. A key Fundamentalist proposition concerning the dynamics of the capitalist mode of production—that rent deters capitalist development in agriculture—is demonstrated in the context of the sylized Fundamentalist model. This result is contrasted with Okishio's theorem which holds that individually profitable technical change will cause the general rate of profit to rise.

INTRODUCTION

A coherent and comprehensive approach to the problem of value, from whatever theoretical or political perspective, must eventually confront the problem of nonproduced means of production. The first chapter of Ricardo's *Principles* on "Value" was followed by a second on "Land." Marx postponed his discussion of rent until the third volume of *Capital,* but the sheer quantity of his writing on the topic (more than 600 pages in total) indicates that he did not take the matter lightly. In this paper we construct and compare two stylized accounts of rent, landed property and nonproduced means of production prominent in current Marxist literature which we shall rather loosely refer to as "Neo-Ricardian"and "Fundamentalist."[1]

Between Neo-Ricardians and Fundamentalists there are, of course, differences on rent stemming directly from incongruities in their corresponding perspectives on value.[2] The Neo-Ricardian theory of nonproduced means of production is an extension of the classical system of reproduction prices, as set forth in Sraffa (1960), in which no conceptual distinction is made between price and value. For Fundamentalists, on the other hand, prices are not necessarily proportional to values and one must be careful not to confuse the two.[3] Indeed, since land by Fundamentalist definition is without value, yet nevertheless has a price, the theory of rent and landed property

*We wish to acknowledge the insightful criticisms of the editors of the *RRPE,* as well as Darryl McLeod and Alain de Janvry

provides an eminent example of an applied Fundamentalist value theory.

In addition to opposing views on value, there are other important differences between Neo-Ricardians and Fundamentalists. Within Fundamentalist literature, the theory of ground rent not only serves as a foundation for, but is also inextricably bound up with, a more general theory of the development of capitalism in agriculture. Marx was a careful student of the laws of motion of capitalism and Fundamentalist analysis tends to reflect this concern with the dynamics of capital accumulation. The Sraffian system, on the other hand, is steeped in the classical analytical tradition of applying restrictive assumption upon restrictive assumption until the dimension of the problem is sufficiently reduced to allow formal theorems to be stated and proved. Sraffa's world is essentially a static, equilibrium construct in which the size and composition of output is given, along with the technology and real wage.[4] Under these assumptions, prices, rents and choice of technique are adequately handled; but the theory has little to say about the more dynamic problems such as the transition between techniques, the theory of capitalist crisis and accumulation of capital.

In order to contrast Fundamentalist and Neo-Ricardian theories of rent, we first translate Fundamentalist propositions into the Sraffian analytical framework. Inasmuch as the differences in Fundamentalist and Neo-Ricardian traditions within Marxism run very deep, the project is subject to inherent limitation and bias. Besides the fact that the Fundamentalist position is better represented within their own conceptual framework, some oppose the very idea of rendering their work in "models." Even though a number of important propositions do survive the translation, Fundamentalists could reasonably object to the exposition of their theories in this deliberately contrived environment.

The paper is organized as follows: the following section defines the general theoretical problem of nonproduced means of production and, together with the third section, makes clear what we consider to be Sraffa's fundamental contribution to the theory of rent. The next section contrasts Sraffa's results with the Fundamentalist approach which is seen to hinge upon a conception of landlords as active agents in the struggle over the distribution of the surplus. A final section considers the Fundamentalist proposition that private property in land retards the development of capitalism in agriculture. This result, which can be demonstrated under both Sraffian or Fundamentalist assumptions, runs counter to the celebrated Okishio theorem in which technical progress always improves the general rate of profit.[5]

NONPRODUCED MEANS OF PRODUCTION: THE PROBLEM

A central propostion in the Fundamentalist literature on rent is that landed property under capitalism is a relation of *distribution* rather than of *production* (Murray 1977:29). This result, originally due to Ricardo, may be considered the "fundamental theorem" of the theory of rent inasmuch as it implies that nonproduced means of production are not necessarily incompatible with reproduction theories of value.[6] The proposition is obviously of crucial importance since, if correct, it means that rent may be properly conceived as a deduction from the total social product of labor, rather than a separate component of price as Smith had supposed.

Ricardo constructed a simple example, under a fairly plausible set of assumptions, in which the existence of nonproduced means of production did not contradict the labor theory of value. Let there be but one nonproduced means of production, land, of which various qualities may be continuously ranked according to fertility. Not all land is in production; but land which is cultivated is more fertile than land which is not. Under these circumstances, commodities will continue to exchange according to their embodied labor, provided the value of agricultural output is determined by the labor required on the *least* fertile plot. As long as there is some land left uncultivated, competition between landlords will insure that no rent will be paid to the owner of the land last brought under cultivation.

The Ricardian story has been the object of criticism on counts of both realism and theoretical adequacy. Marx noted that landlords do not customarily cede usufruct to landed property without some form of compensation and, consequently, Ricardo's "no-rent" land was chimerical. Samuelson agreed, referring to the device as a "trick" designed to salvage the labor theory of value. "Land" was evidence that means of production could not always be resolved into components of direct and indirect labor time (Samuelson 1959).

The Marx-Samuelson critique notwithstanding, Ricardo's scheme was an enormous success in one important respect: Ricardo had discovered a way to resolve the apparent conflict between the labor theory of value, in which all means of production were assumed to be freely reproducible, and the need to account for the role of land, natural resources and other *non*-produced means of production. Ricardo's solution consigns owners of nonproduced means of production to what Marx calls the realm of circulation: landlords extract a "cut" of the total surplus. The size of the cut is determined by two features of the economy over which landlords exercise no direct control: (1) the level of effective demand in relation to the available quantity of fertile land and (2) the system of commodity exchange ratios. The primary struggle remains that between capital and labor; rent is the by product of capitalist competition in the scramble to satisfy the demand for commodities.

If the second chapter of *Principles* shows that a solution to the general problem of nonproduced means of production exists, subsequent thought has just as clearly indicated that it is not unique. Posed in a generic way which will admit both Neo-Ricardian and Fundamentalist solutions, the problem is this: conceived as a solution to a system of simultaneous equations, both labor values and prices of production assign to each commodity a number which is the sum of direct and indirect costs of production. If the means of production consist of only produced commodities, the system of equations can account for an arbitrary number of commodities provided that, for each good, there exists an independent equation describing its physical costs of production. For nonproduced means of production, however, there is by definition no cost-of-production equation; the system of price or value-determining equations is indeterminant and must be closed by some other means.

Fundamentalists take the labor value of land as zero, arguing that if only labor creates value, and land embodies no labor, land can contribute no value to the commodities it is used to produce. Land does, however, have a positive *price* which is regulated by the value of the commodities produced on the land. Hence, Fundamentalists integrate theories of value and price in order to generate a coherent theory of nonproduced means of production. Neo-Ricardians, on the other hand, do not distinguish price and value. The system of price-determining equations is closed by introducing alternative production processes until the number of cost-of-production equations is equal to the sum of the number of produced and nonproduced goods. The following sections provide the details of these two approaches.

CLASS CONFLICT AND EFFECTIVE DEMAND: THE SRAFFIAN SYSTEM

Sraffa's *Production of Commodities* is largely devoted to the study of economies in which all commodities are freely reproducible. In the short chapter 11th called "Land", however, Sraffa considers "natural resources, land and mineral deposits which being in short supply enable their owners to earn a rent." There Sraffa distinguishes two species of rent: intensive and extensive. If more than one method of production is employed on the same quality of land, rent on that quality of land is intensive; otherwise, rent is extensive.

Intensive and extensive rent arise from alternative methods of closing the system of price-determining equations with nonproduced means of production. Consider first the case of intensive rent in which all land is of uniform quality. There are two sectors: agriculture and industry. Agriculture employs land among its means of production, but industry does not.[7] Each uses the other's output and there are no durable capital goods other than land. The Sraffian price-of-production equations may then be written:

$$\begin{aligned} p_1 &= (1+r)(p_1a_{11}+p_2a_{21}) + wl_1 \\ p_2 &= (1+r)(p_1a_{12}+p_2a_{22}) + wl_2 + \varrho t_2 \end{aligned} \tag{1}$$

where r is the uniform rate of profit, a_{ij} is the input-output coefficient describing the amount of the ith good required for the production of one unit of the jth good; w is the wage rate; l is the direct labor coefficient which measures the number of hours of living labor required per unit of output; t is the land coefficient; ϱ is the rent per acre and p_1 and p_2 are the prices of the industrial and agricultural good respectively.

Were equation (1) to describe a simple Sraffian economy in which there were no nonproduced means of production, we would have two equations and four unknowns, w, p_1, p_2, and r. Fixing either the wage rate or the profit rate and taking one price as numeraire, the remaining variables are determined. The problem posed by the introduction of nonproduced means of production is now clear: there is an additional variable, ϱ, without an additional equation to determine its magnitude. Sraffa's solution is to add the missing equation according to whether rent is intensive or extensive. For the case of intensive rent, the additional equation describes an alternative method of production observed operating on the uniform quality of land:[8]

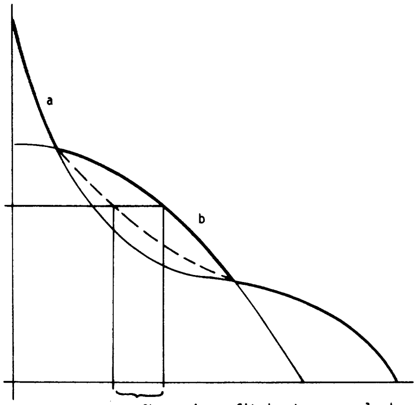
$$p_2 = (1+r)(p_1a_{13}+p_2a_{23}) + wl_3 + \varrho t_3 \qquad (1^*)$$

Assuming a given level of real wages, equation (1*) serves to close system of equations (1), thereby defining a set of prices, profits and rents for this simple economy. Note, however, that equation (1) and (1*) must satisfy several restrictive conditions in order to yield a meaningful solution. Since tenant farmers operating either method must sell their output at the same price, p_2, it is evident that *the process with the highest land productivity, (the smallest t) must also have the highest nonland costs.* If this condition is not fullfilled, either rents, profits, or the relative price will be negative.

The existence of two methods operating side-by-side on the same quality of soil indicates that land is *scarce* since, if it were not, only one method—the cheapest at the given level wages—world be operated. The high-cost process is employed only because the cheaper method cannot produce sufficient output to satisfy the given level of effective demand for agricultural produce. In the Sraffian scheme of intensive rent, land is scarce in a very particular and well-defined sense: given the existing book of blueprints for agricultural technologies, the technique which corresponds to the highest economy-wide rate of profit for the given wage uses too much land per unit of output to meet the demand. Some combination of the two methods is required and rent (as well as prices and profits) adjusts until the difference in land productivity is just balanced by the differences in nonland costs and profits.

In terms of the familiar wage-profit line of Figure 1, scarce land implies that the economy is forced to operate *inside* the envelope of the two techniques (a) and (b) (for which one of the two agricultural methods is exclusively employed) along the dotted wage-profit line. This line represents combinations of wages and profits which can be paid when *both* agricultural processes are operated simultaneously and is a linear combination of the two wage-profit lines when only one process is employed.[9] What could have been paid as additional profits for a determinate wage, were it possible to employ only the low-cost process, now accrues to landlords in the form of *rent*.

Figure 1: Intensive Rent



It is obvious that an exogenously specified level of effective demand plays a pivotal role in Sraffa's theory of rent since without some notion of how much output is required, it would be impossible to justify the existence of the additional high-cost process. Rent in Sraffa's system therefore depends upon land's scarcity in relation to the demand for output, but "scarcity" is not a given fact of economic life independent of the social relations in the society. The very notion of scarcity in Sraffa hinges on the outcome of class conflict, that is, upon the level of wages and profits. This can be easily seen as follows: side on the same parcel. A high-cost, land-saving method is used together with a low-cost, land-intensive method. But note that which method is, in fact, the low cost method depends upon the level of wages and profits. Hence, it is possible that at some level of wages and profits, the land-saving method is also the low cost method; the other method is then abandoned and rent falls to zero. (This is, by the way, why the dotted line is only relevant *between* the two switchpoints in Figure 1).

Why are we so sure the rent falls to zero? Formally, only a zero rent is consistent with the system of price-determining equations since, when the level of wages and profits does not support the operation of two processes, the system is mathematically indeterminant. But this result also jibes with a competitive vision of how land rents are formed. Once the high-cost, land-saving method comes to dominate, not all land need be utilized. Since total physical output must have been lower at levels of wages and profits for which both methods were employed, it follows that with only the land-saving method in operation, some land will go unrented. Unless the given level of effective demand changes, competition between landlords will continuously bid down land rent. Land, at this level of wages and profits, ceases to be scarce.

For the purposes of comparison with the Fundamentalist approach, it is important to understand the vision of the historical processes which underlays the Sraffian conception. Sraffa's theory of intensive rent is about an economy in which there is a fixed quantity of homogeneous land with a book of blueprints of feasible technologies available to all producers. As the level of demand for output rises over time, more costly methods are employed to increase yields; land-saving methods gradually displace land-intensive methods. Unless there is some change in distribution or intervening technical progress, new methods are never at the same time land saving and cost reducing. Were such methods available, they would already have been employed. It is apparent, then, that the basic logical structure of Sraffian theory does not easily accomodate the more complex problems of capital accumulation, technical change and the transition between techniques. Neo-Ricardian rent theory concentrates rather on the integration of the theories of value and of nonproduced means of production.

As land-saving methods become more and more costly, it may well become more profitable to employ land of lower quality than to operate two processes on the same initial quality. If land of a second quality is employed, one quality of land will earn an *extensive rent.* The system of price-determining equations is closed in a somewhat different way in a regime of extensive rent; an additional equation is supplied, but the equation also contains an additional variable; the rent on the second quality of land. In order to close the system, Sraffa adds yet another equation which effectively requires that one quality of land receive no rent. Rewriting equations (1) and (1*) to account for different qualities of land, we have:

$$\begin{aligned} 1 &= (1 + r)(a_{11} + p_2 a_{21}) + wl_1 \\ p_2 &= (1 + r)(a_{12} + p_2 a_{21}) + wl_2 + \varrho_1 t_2 \qquad (2) \\ p_2 &= (1 + r)(a_{13} + p_2 a_{23}) + wl_3 + \varrho_2 t_3 \end{aligned}$$

in which the price of the first commodity is taken as the numeraire. This general system of price-determining equations is then closed by either:

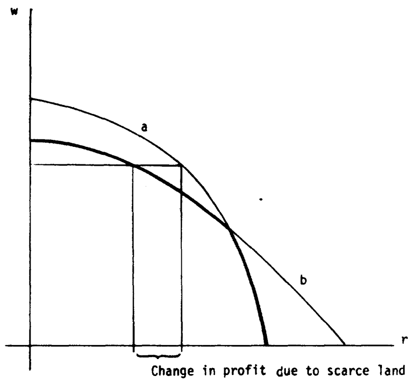
$$\begin{aligned} \varrho_1 &= \varrho_2 \quad \text{intensive rent} \\ \varrho_1 \varrho_2 &= 0 \quad \text{extensive rent} \end{aligned}$$

depending upon whether the land is of the same quality in the two land-using processes.

The determinants of land rent in systems with extensive rent are essentially the same as in the intensive case. A given effective demand cannot be satisfied with the existing technology, land availability and level of wages and profits. A second process must be introduced which uses lower quality of land to fill the gap in the demand for food. The price of the output must rise by an amount sufficient to cover the costs of production in both processes and the result is that one process is able to pay a rent which is precisely equal to the difference between the costs of production of the two methods.

As in the case of extensive rent, land's scarcity, that is, which land pays a positive rent, again depends on class struggle. In Figure 2, wage-profit line (a) corresponds to a system comprised of the first two equations of (2); wage-profit line (b) is for the first and third equation. With extensive rent,

Figure 2: Extensive Rent



the *interior* envelope of the intersecting wage-profit lines describes the combinations of wages and profits relevant to the economy. Were there no necessity to produce a given amount of output for the economy, only the technique paying the highest rate of profit for any given wage rate would be employed. But since both processes must be employed, it is the lowest of the two profit rates for a given wage rate that becomes the economy-wide rate of profit. The surplus which could have appeared as a higher general rate of profit is now captured as rent is now captured as rent by the owner of the more "fertile" plot.[10]

FUNDAMENTALISTS: LANDED PROPERTY AS A BARRIER TO CAPITALIST DEVELOPMENT IN AGRICULTURE

Summarizing the Fundamentalist literature on ground rent is no simple task and it will not be attempted here. We shall be content with a few characterizations of tendencies in a sample of relatively recent literature.[11] The reason for this rather blithe attitude are obvious to anyone who has attempted to wade through the existing Fundamentalist material on rent. First, Marx's own work was lengthy, inelegant and, above all, tentative; not one of the several hundred pages written in *Capital* and *Theories of Surplus Value* on the topic of rent was ever approved for publication by the author. Second, Fundamentalists have only agreed to disagree; even on the principal issues identified here, there is not completeconsensus. Finally, in regard to the question of clarity and rigor, Fundamentalist work on rent is not unlike Fundamentalist writing on the theory of value in general; the use of particularized numerical examples, confusion between partial and general equilibrium constructs, as well as heavy emphasis upon a usually unspecified "conceptual framework" all serve to diminish the impact of otherwise insightful analysis.

The Fundamentalist propositions of central concern to the discussion to follow are two, and both are grounded in the view of rent as a form of the surplus pumped out of the working class:

1. The Ricardian supposition that the marginal land earns no rent is unduly restrictive. Whether in the form of "monopoly rent," or the ability to sell agricultural output at a value above its price of production, landlords are able to exact an *absolute rent* from tenant capitalists who farm their land. Thus, in addition to differential rent, absolute rent constitutes a deduction from the total product of labor.[12]
2. Landed property is an obstacle to capitalist development because it inhibits investment and blocks technical progress in agriculture.

The first of these arguments is what Fine calls "the static formulation of the distribution of surplus value" (Fine 1979:253) while the latter poses the dynamic problem of the choice of technique, forms of technical progress and the effect upon the rate of profit. Both of these propositions suggests that, for Fundamentalists, "landowners can play a determinant role within capitalist societies by acting as a contraint on the accumulation of capital and by influencing the distribution of land uses" (Ball 1979:380). As owners of essential means of production, landlords exercise control over the conditions of existence and reproduction of capitalist economies. This enables owners of landed property to take a "cut" of the total surplus, thereby reducing the surplus available for accumulation (Resnick and Wolff 1982). Capital cannot freely flow into agriculture to eliminate surplus profits as it would in industry; hence, the pace of capital accumulation in agriculture is retarded by the ability of landlords to capture surplus profits in the form of either absolute or differential rent.

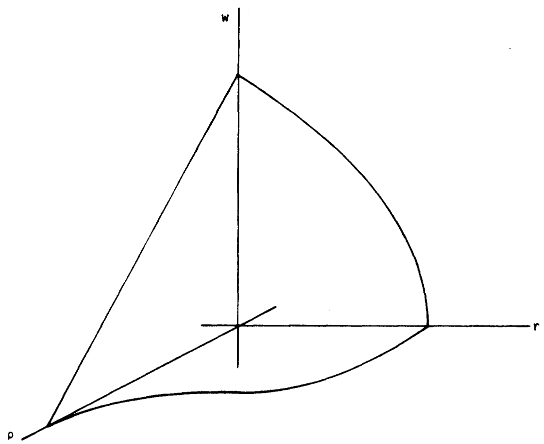
Moreover, there is no tendency for the most efficient method to dominate in agriculture, as in industry, inasmuch as fertile land is limited in supply; further accumulation on productive soil is blocked by the need to pay rent. "The rent relation in effect places an artificial restriction on output..." (Ball 1977:396). If land quality is altered in production, the barrier to investment is even greater since "improvements incorporated in the soil become the property of the landowner as an inseparable feature of the substance, the land... (Marx 1967:620).

We shall attempt to sort out these Fundamentalist propositions by first specifying a static model and then considering the problem of choice of technique and technical change. A fully developed Fundamentalist model would also discuss the transition between techniques as an integrated aspect of the static formulation. Since no adequate (formal) theory of transition exists, it is somewhat difficult to interpret Fundamentalist writing in this way. Our "dynamic" discussion will therefore be limited to the effect of technical change on the rate of profits.

Absolute Rent

The formal specification of the Fundamentalist model is equivalent to equation (1) *without* the addition of (1*). In the system of equations (1), there are two equations and (once the level of wages is fixed) three unknowns: the relative price, the profit rate, and the rent, ϱ. Since there is only one quality of land, rent in this system must be absolute rent; there is no differential rent. How is the rent determined with only two equations? The thrust of Fundamentalist analysis suggests that landlords comprise a separate class which independently struggles over the surplus produced by labor. In other words, rather than the traditional wage-profit line drawn by Neo-Ricardians in two-dimensional space, Fundamentalists effectively employ a three-dimensional *wage-profit-rent surface* described by equation (1) and depicted in Figure 3. Choosing a point on this surface fixes the relative price, the profit rate, the wage rate and the level of rent.

Figure 3: Fundamentalist's Rent Model



We do not suggest that the complexity of Fundamentalist thought on rent can be reduced to the simple diagram of Figure 3, but it is a concise representation of the theoretical tasks that Fundamentalist literature sets for itself. If in the two-dimensional case, for example, the level of wages is taken as given, a full theoretical explanation of why wages are given at that particular level is, of course, still required. In the classical Marxian tradition, wages are determined by susbsistence requirements plus a moral-historical element. Once determined, the rate of profit follows from the diagram. Adding a third axis to this diagram does not alter the basic approach in any essential way. Fundamentalists are in need of some theoretical determination of the level of rent, and this they supply via the theory of *absolute rent*.

Marx's theory of absolute rent suggests that agricultural output is sold at its labor value rather than its price of production. Owing to a low organic composition of capital, agriculture's value is typically above its price: the difference constitutes an absolute rent that is paid independently, that is, over and above differential rent. Formally, equations (1) are closed by adding an equation (actually, a system of equations) to determine p_2. This system of equations is none other than the well-known value-determining equations:

$$\begin{aligned} \Lambda_1 &= \Lambda_1 a_{11} + \Lambda_2 a_{21} + l_1 \\ \Lambda_2 &= \Lambda_1 a_{12} + \Lambda_2 a_{22} + l_2 \end{aligned} \tag{3}$$

with

$$p_2 = \Lambda_2$$

in which Λ_i is the labor value of the ith good and the other parameters are the same as in equations (1). The five equations of (1) and (3) rigorously define a system of absolute rent.

Unfortunately, most of the interesting properties of absolute rent, defined as it is here, depend upon Marx's own method of transforming values into prices of production. As is well known, Marx solves the transformation problem in the third volume of *Capital* by defining prices as the sum of costs plus a rate of profit on total capital invested. Values are defined in the normal way as the sum of direct plus indirect labor time. For the most part, the logic of Marx's solution is impeccable; but there is one point at which Marx did cut corners. Rather than valuing capital costs in terms of prices, Marx uses values. The mathematics of Marx's solution is much simpler and the solution more transparent; moreover, as Shaikh [1977] has shown, Marx's shortcut is adequate for most purposes. Absolute rent is one of the few exceptions.

The difficulty can be seen as follows: valuing capital in terms of its labor content instead of prices creates the false impression that the magnitude of capital is independent of the struggle between capital and labor. For Marx, the assumption was one of pure convenience, but the neoclassical school, for reasons that are obvious, took the shortcut more seriously. The approach to capital as a physical, rather than social, magnitude was used with impunity by the neoclassicals for almost one hundred years. Only recently have neoclassicals come to admit the logical incoherence of this very powerful assumption.[13]

If capital is valued according to its embodied labor, it is easy to show that commodities with a high organic composition of capital, relative to the average, sell at prices of production greater than their labor values and vice-versa if the organic composition is below average. Since agriculture, independently of rent, is usually assumed to have a low organic composition, its value is typically greater than its price. Thus, if agriculture sells its output at its value rather than price, it reaps a superprofit. This surplus, however, eventually turns up in the pockets of landlords, since capitalists attempting to enter the agricultural sector, in response to the higher profits there, bid up rents.

But why would agricultural commodities be sold at their values rather than their (properly computed) prices? Here the story becomes more ad hoc. Murray (1977, 1978) following Marx, argues that "landed property presents a barrier to prospective capital." Thus, rent itself inhibits the free flow of capital and the subsequent development in the agricultural sector. Agricultural products then exchange at their values for historical reasons: all commodities originally exchanged at their values, and landed property binds agriculture to this tradition. International competition, market demand, and other unspecified mechanism somehow prohibit agricultural prices from rising above their values.

Unfortunately, once it is recognized that the magnitude of capital depends upon the outcome of the fight over wages and profits, there is no neat device such as the organic composition of capital, to predict whether prices will be above or below values. If agricultural prices equal values, absolute rent may well be negative even if organic compositions in agriculture are low. To see this, consider the following example:

$$A = \begin{bmatrix} 1/2 & 1/2 \\ 1/8 & 1/4 \end{bmatrix} L = [3/8\ 1/4]\ T = [0\ 1]$$

The labor values of this system are easily seen to be unity. The price determining equations are then:

$$p_1 = (1+r)(p_1/2 + p_2/8) + 3w/8$$
$$p_2 = (1+r)(p_1/2 + p_2/4) + w/4 + \varrho$$

taking $p_2 = 1$ and solving for in terms of $\pi = (1+r)$, we have:

$$\varrho = 1 - \frac{\pi^2 + 3w\pi}{16(1-\pi/2)} - \frac{\pi + w}{4}$$

for $w = 0.5$, a rate of profit of 10 percent, the rent is 0.2 whereas if the rate of profit were raised to 30 percent, the rent would turn negative.

Absolute rent cannot, therefore, depend upon the organic composition of capital, as claimed by Fundamentalists and Marx himself. Changing the profit rate (which would occur as a result of a change in the conditions of class struggle) does not directly affect the organic composition but does radically change the amount of rent paid to landlords (in this case, the rent changes from a positive to a negative quantity). The reasoning behind this result is very straightforward: the organic composition of capital depends upon the technical coefficients and labor values which are not altered by a change in the rate of profit. Absolute rent, on the other hand, *does* depend upon the outcome of class struggle, that is, upon the level of wages and profit. Even if the organic composition of capital is higher in agriculture than in industry, rent can be positive, negative or zero. From this we must concluded that the Fundamentalist theory of absolute rent cannot be linked to the organic composition of capital or, indeed, any strictly physical magnitude whatsoever. Fundamentalists have apparently fallen victim to the same brand of logical contradiction which upset the neoclassical theory of distribution by failing to realize that absolute rent is proximately determined by class struggle, rather than properties of the technology, fertility, etc.

Monopoly Power

The tentative, almost speculative nature of Marx's theory of absolute rent has led some Marxists to reject its link to the labor theory of value while, at the same time, adhering to the view that even marginal land must earn a rent [Emmanuel 1972: Ch. 5; Ball 1980:319]. Absolute rent can then be seen as a "monopoly price" extracted by landlords in proportion to their monopoly power. Formally, abandoning the labor theory of value as the determinant of agricultural commodity prices makes very little difference inasmuch as the price/value of agricultural output is exogenous to the price- and profit-determining equations. As we have just seen, the orthodox formulation of absolute rent essentially closes the price- and rent-determining equations by setting the price of agricultural output equal to its labor value.[14]

An analytically similar solution is to take p_2 as given by "monopoly power," or equivalently, let the rent be determined by some given return landlords have traditionally been able to extract. Note that, if one adheres to the standard treatment of absolute rent in which values are linked to prices by real history, one is effectively allowing prices to be determined by the conjuncture rather than through the competitive equalization of the profit rate. Seen in this light, whether absolute rent is linked to values, landlord's power or what have you, is not material: by taking either rent or the price of agricultural output as determined exogenously, Fundamentalists essentially posit a three-sided class conflict. This approach is in clear contrast to the Sraffian system in which effective demand reduces the three-dimensional wage-profit-rent surface to a wage-profit line

LANDED PROPERTY AND TECHNICAL PROGRESS: OKISHIO'S THEOREM WITH NONPRODUCED MEANS OF PRODUCTION

What is most unsettling about the Fundamentalist attachment to absolute rent is not its dependence upon the labor theory of value nor even its failure to account for price movements in the valuation of capital. It is rather the view that the need to pay rent on marginal and intramarginal land alike, itself blocks the development of capitalism in agriculture. To the extent that rent is paid from the surplus produced by labor, profits will of course suffer. But if landlords have the same savings behavior as capitalists, it is not at all clear how total investment is supposed to diminish. If, on the other hand, landlords consume more of their total income, which historically does seem to have been the case, investment will fall. The Fundamentalist theory of agricultural stagnation, then, seems to turn on the savings behavior of landlords.

Putting aside, for the moment, questions of savings propensities, one might still ask what deters capitalists from investing in resource-based activities. Why are capitalists not able to consider rent like any other cost that must be paid and passed on in the price of the commodity? If rent is paid in advance, rent becomes part of total capital invested and a rate of profit is charged on that investment like any other. If the rent is paid ex-post, it is treated just like wages. At least from the point of view of static analysis, rent to capitalists is a cost like any other which is simply passed along in the form of higher prices.

In light of these arguments, it is difficult to see how the "rent relation" deters capital accumulation any more or less than other costs borne by capitalists. For a given level of output, it is true that any increase in real costs, assuming a given real wage, implies a reduction in the surplus. As the level of demand rises, land appears as negative technical change, reducing the relative surplus value produced. This is not to say that the effect of limited land supplies cannot be outweighed by a more vigorous rate of technical progress; on the contrary, the history of capitalist development shows that this has tended to occur.

But does this mean that the Fundamentalist intuition, largely derived from Marx's own observations on landed property, is incorrect. Not entirely. Indeed, the Fundamentalist view on technical progress in agriculture can be seen as a coherent extension of the static, three-dimensional struggle characterized in Figure 3. Let us review the argument. Rent, Fundamentalists would say, is not a cost "just like any other" since, as accumulation and technical progress proceed, rents tend to rise while other costs fall. This tendency for rents to rise in the wake of technical progress is what leads to stagnation in agriculture. To see this (as well as other points made below), consider the following supersimplified economy in which there is one commodity, wheat, which uses seed as its only input. Labor's real wage is fixed and given in terms of wheat. The input-output coefficient, a, is assumed to account not only for capital costs, but *also* labor's consumption. Taking the price of wheat as the numeraire, the rent-determining equations for the Fundamentalist model can be written:

$$1 = \pi a + \varrho t$$

$$\varrho = f\ (\text{landlord's power})$$

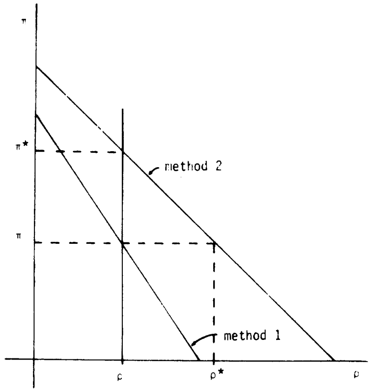
where f is an arbitrary function with a positive first derivative and π is unity plus the profit rate. This expression can be rewritten as:

$$\pi = 1/a - (t/a)\varrho$$

so that the slope is the negative of the land-capital ratio and the intercept is the output-capital ratio. A graphical solution to this system of equations is presented in Figure 4.

Note that there are no Sraffian alternative processes and thus ϱ is an absolute rent. In Figure 4, the higher the y-intercept, 1/a, the more capital saving is the method, whereas the greater the x-intercept, 1/t, the more it saves

Figure 4: Technical Change in the Fundamentalist Model



on land. Let the initial equilibrium be represented by π and ϱ. A new method now becomes available which saves on both land and capital, and is shown as method 2 in Figure 4. If rent remains constant at the level ϱ, the rate of profit rises to π^*. This increase in the rate of profit certainly provides an incentive to capitalists to abandon method 1 in favor of method 2. But while in a Sraffian model, landlords might stand idly by while capitalist tenants purchase new equipment and erect new structures in order to lower their land and capital coefficients, Fundamentalist landlords are not so passive. The latter are provoked by what they see as higher profits likely to result from this new investment; they intervene and raise the rent which shifts the vertical line to the right. Neighboring tenants are thereby dissuaded from adopting the more productive method and the overall enthusiasm for investment and accumulation is dampened.

Fundamentalist landlords are not, of course, without limits to their power. Rent in excess of ϱ^* reduces profits below the competitive rate; rent then falls as capitalists abandon agriculture for more profitable lines. But if landlords are sufficiently powerful to just capture all surplus profits, the incentive to invest could completely evaporate. Marx himself wrote:

> But this is at the same time one of the greastest obstacles to the rational development of agriculture, for the tenant farmer avoids all improvements and outlays for which he cannot expect complete return during the term of the lease [Marx 1967:620].[15]

It would thus seem that rational landlords would not raise rent to its maximum since, eventually, no technical progress would take place and rent would stagnate at ϱ. If some moderation were exercised, both rent and profits could rise simultaneously, but greedy Fundamentalist landlords have a tendency toward self-destruction. It is not difficult to see why Fundamentalists conclude that it is in the collective interest of capital to eliminate landlords, since no matter how passive or docile they may be, the specter of rent diffuses the urge to accumulate.

Presented this way, the Fundamentalist argument is reasonable and coherent and not without considerable appeal. The only remaining source of criticism is that it fails to take into explicit account the level of effective demand in the determination of the variables in the system. Method 2 of Figure 4 shows a higher output per acre than does method 1. If generalized, the gross output of this method would exceed the given level of effective demand; prices, profits, wages and rents would probably change but not in a way predictable by the theory.

It will be interesting to see whether in fact the Neo-Ricardian approach, which does, however feebly, take into consideration the macroeconomic consistency of the technical advance, produces the same barrier to accumulation. In a world in which all commodities are reproducible, the adoption of new methods, profitable at the existing level of wages, profits, and prices, always leads to a higher general rate of profit. This result, known as Okishio's theorem, has been shown in recent literature to be very robust; it holds generally for nonjoint-product economies under the assumption of a fixed real wage. When land is scarce, however, and two processes are observed operating on the same quality of land, the theorem does not necessarily hold. Indeed, there are some very important instances in which it can be shown that the existence of rent and landed property causes capitalists to adopt new methods of production which actually leads to a fall in the general rate of profit.[16]. To the extent that this effect is anticipated by capitalists, land inhibits the adoption of more efficient methods which would raise rents at the expense of profits.

The Sraffian equations for the same economy, can be written:

$$1 = \pi a_1 + \varrho_i t_1$$
$$1 = \pi a_2 + \varrho_2 t_2$$

with either

$$\varrho_1 = \varrho_2 \text{ (intensive rent)}$$
$$\varrho_1 \varrho_2 = 0 \text{ (extensive rent)}$$

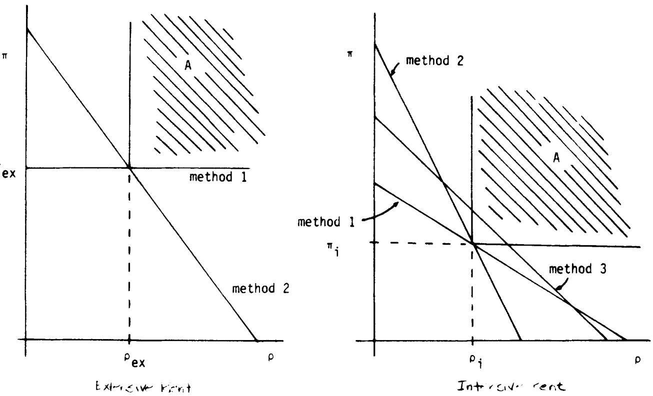
as the closing equation. These equations are plotted in Figure 5. Note that in contrast to Figure 4, the profit factor, π, and rent, ϱ, are determined as the simultaneous solution for both method 1 and 2 rather than by reference to landlord's power. The extensive solution (with $\varrho_1 = 0$) is shown as π_{ex} and ϱ_{ex} while intensive solution is π_i and ϱ_i. It is obvious from the diagram with the highest yield (method 1) is also the more costly.[17]

Consider now the problem of technical change. If a new process becomes available, which either saves on land or capital, it will be adopted by profit maximizing capitalist, that is, if:

$$(1 + r)a_3 + \varrho t_3 < 1 \qquad (4)$$

where r and ϱ are the *existing* rates of profit and either intensive or extensive rent. If this condition is satisfied, there is some combination of profit and rent such that the method falls within the shaded area A, i.e., it can pay a higher profit, higher rent, or some combinatiom of the two.

Figure 5: Technical Change in the Sraffian Model



For the case of extensive rent, observe that the rate of profit is determined soley by the first process. Technical change in the second process only results in higher rents in that process without affecting the level of profits. On the other hand, technical change in the first process changes the level of both profit and rent; a capital-saving innovation raises the rate of profit and lowers rents. In no case, however, could technical change result in a *reduction* of the profit rate; hence, if technical change is profitable to the individual capitalist, it will never result in a lower economy-wide rate of profit. In other words, Okishio's theorem holds in cases of extensive rent.[18]

In the second frame of Figure 5, land is of uniform quality with methods 1 and 2 operating simultaneusly to produce the given level of effective demand. Observe that with intensive rent it is quite a trivial matter to construct a feasible technology such that the rate of profit falls and the rent rises. Improving the yield of the land-saving process (method 1) will always raise profits and lower rents. Similarly, increasing the capital productivity of the land-saving method will also increase profits to the detriment of rents (recall that we are holding wages constant by assumption). An increase in the yield of the capital-saving process (method 2), however, will generally reduce profits and increase rents. This is shown in the second panel of Figure 5, in which the intersection of methods 1 and 3 is to the southeast of the intersection of methods 1 and 2. Improving the land productivity of the low-yield capital-saving process increases rents and decreases the rate of profit.

Technical progress in the second, capital-saving, method need not always reduce the rate of profit. If, for example, method 3 is capable of producing the entire required quantity of wheat, the combination 1, 3 is not viable since it would over-fill the demand. The high-cost method, 1, is abandoned, and methods 2 and 3 satisfy the demand at a higher rate of profit and a much lower rent. Thus, systems with intensive rent can contradict Okishio's theorem though they need not do so.

Observe that it cannot be claimed that we have rigorously demonstrated the Fundamentalist proposition that landed property inhibits capitalist development in agriculture inasmuch as a lower economy-wide rate of profit need not mean anything to agricultural capitalists. Myopic agricultural capitalists at the intersection of methods 1 and 2 would adopt method 3 since it satisfies the adoption criterion of equation (4). Only if it becomes obvious that the persistent adoption of new technologies led uniformly to a lower rate of profit would we expect capitalists to slow the pace of accumulation in agriculture. Otherwise, the rent relation could be maintained and, as long as agricultural capitalists were earning the going rate of profit, accumulation and innovation would proceed, as in industry.

CONCLUDING REMARKS

The principal conclusion which emerges from this study is that there are basic differences, perhaps even more basic than on the issue of value, between Neo-Ricardians and Fundamentalists on the problem of nonproduced means of production. Neo-Ricardians close the system of rent and price-determining equations by explicit reference to the level of effective demand, whereas Fundamentalists allow the political and economic power of landlords to affect the return to nonproduced means of production. Sraffian landlords are bystanders, passive recipients of income proximately determined by the clash between capital and labor. Fundamentalist landlords do not capture residuals, but rather fight for their own cut and in the process reduce the drive of capitalists to accumulate. The struggle between workers and capitalists in the Neo-Ricardian system remains primary; scarce land is just one of the many parameters which defines the site of this struggle. The orthodox version is more complex in that the essential conflict is diluted by the intervention of landlords.

Differences in the static conception of the distribution of the surplus naturally lead to different dynamic formulations. For Fundamentalists, rent prevents the rate of profit from rising as a result of technical progress. The rate of profit will actually fall only if landlords attempt to capture more surplus than is generated by the innovation. This is generally not possible, however, since capitalists abandon processes which do not return an average rate of profit. In the Sraffian conception, the adoption of methods, super-profitable at existing prices, may or may not lead to a lower general rate of profit depending upon the environment in which the technique is adopted. In a world with only extensive rent, Okishio's theorem holds and the rate of profit always rises with technical improvement. With intensive rent, on the other hand, technical improvement can lead to a fall in the economy-wide rate of profit, contradicting Okishio's theorem. Ironically, it is the Sraffian scenario, rather than the Fundamentalists' which is most likely to lead to a falling rate of profit.

In order to assess the effect on the rate of expansion of the economy, one must probe more deeply into the question of the effect of the rate of profit on investment. Fundamentalists tend to assume (often implicitly) that (1) available surplus extracted from workers determines the rate of investment; and (2) landlords are sociologically distinct from capitalists and, therefore, any shift in income from the latter to the former would reduced total savings. Though Sraffians have yet to produce an adequate dynamic account of accumulation, it is doubtful that either of these assumptions would play an instrumental role.

The constellation of Fundamentalist assumptions implies that landlords pose a more serious barrier to the accumulation process than do Sraffian landlords. This is due primarily to the notion that accumulation in Sraffa's system is not bounded by the surplus available in the current period. Prices and quantities are not strictly linked, as in neoclassical analysis, inasmuch as a major determinant of the size and composition of output, investment, is not determined endogenously. Landlords may indeed take a cut of the surplus, and they may even consume it all. The effect on the next period's level of investment, however, will likely be swamped by more Keynesian determinants, such as credit availability, expectations of future sales prospects, competition from abroad and the outcome of the struggle with labor, to mention a few of the more important elements. While the level and determinants of effective demand dominates the Neo-Ricardian approach to nonproduced means of production, these features are more subordinate in the Fundamentalist conception of rent and its impact on accumulation.

Extending the theory of value to account for nonproduced means of production is no simple task for either Neo-Ricardians or Fundamentalists and, indeed, our investigation has revealed weaknesses in both approaches. Fundamentalists must confront the issue of the relevance of a theory of absolute rent linked to embodied labor (or worse, some unspecified concept of "abstract" labor) in a world in which natural resources are extracted by the most capital-intensive and technologically advanced methods in the history of capitalism (and which agriculture has become a principal export for the most advanced capitalist country.) Moreover, a theory of rent which does not formally and explicitly integrate a theory of effective demand (as the Sraffian system feebly attempts to do) is undoubtedly going to have difficulty explaining anything in modern capitalism.

Sraffians face a similar challenge which is also laid at the doorstep of their theory of value. In a world with no nonproduced means of production, Sraffian prices are determined without explicit reference to quantities. Prices are not independent of quantities, but there is no functional dependence as in neoclassical theory. In the theory of rent, however, Sraffians for the first time must take into explict account the size and composition of the total output and even develop a concept of scarcity. Historically, this was the neoclassical road; neoclassicals eventually generalized a similar theory of rent to all commodities in the economy's "endowment." Whether Sraffians will ultimately be caught in the same trap remains to be seen.

Dept of Economics
University of Massachusetts
Amherst, MA 01003

Dept of Economics
University of California
Berkeley, CA 94720

NOTES

1. The distinction belongs to Fine and Harris (1976). These labels will not withstand careful scrutiny: the so-called "Neo-Ricardians," for example, fully accept the central Marxian proposition that profits arise only through the exploitation of labor. See Eatwell (1975) and Steedman (1977). Moreover, Neo-Ricardians typically reject the labor theory of value—to which Ricardo clung until his dying day—in favor of the more general theory of prices of production first suggested by Marx. Prices of production allow positive profits to distort the ratios in which commodities exchange in a more substantial and meaningful sense than Ricardo could have ever guessed. If, for example, capital goods are heterogeneous quantities, prices of production are inconsistent with the neoclassical theory of distribution according to which factors of production receive their marginal products. The labor theory of value finds no fault with this conclusion since "capital" can be defined independently of distribution. Prices of production with positive profits also undermine a number of fundamental theorems in the (neoclassical) pure theory of trade (See Steedman 1979). The common foundation of Neo-Ricardian Marxism is the theory of value set forth in Sraffa (1960). It is therefore probably more accurate to refer to Neo-Ricardians as "Sraffians." We shall employ the terms interchangeably. For more details of the Sraffian approach to rent and non-produced means of production see Schefold (1971), Montani (1975), Scott (1976, 1978), Kurz (1978), Abraham-Frois and Berrebi (1979), Quadrio-Curzio (1980), Gibson and McLeod (1982, 1983) and Gibson (1983). "Fundamentalist" is similarly little more than a name and we shall use "orthodox Marxists" interchangeably. While it is true that Fundamentalists are often more concerned with textual consistency than formalization, nothing more substantive is to be understood by our use of the term. Important Fundamentalist literature on rent includes: Ball (1977) Murray (1977, 1978) and Fine (1979)

2. What at this point seems clear in the long theoretical struggle over the nature and place of a theory of value in Marx is that the issue resists resolution on purely deductive grounds. I. Steedman's (1977) contention that the tendency of orthodox Marxists to detour through the shadowy underworld of labor values obscures and indeed obstructs basic Marxian insights has served primarily to refine traditional views and further entrench their orthodox clients. In our view, the highly polarized literature on the question of value reflects rather deeper methodological divisions which will not be resolved by either logical or empirical means. This paper takes as axiomatic the proposition that the real test of competing methods is performance. The adequacy with which extensions of the basic theory (such as considered here) can be made serves as a measure of the analytical capacity of the approach.

3. It is with some trepidation that we attempt to characterize the Fundamentalist position on rent since the very meaning of value is still in dispute. Many Fundamentalists would, for example, reject the "embodied labor time" interpretation imputed to them here. (See Himmelweit and Mohun 1978; Elson 1979 and Fine and Harris 1979: Chpts, 1 and 2).

4. The Sraffian system of price-determining equations allows for exogenous specification of the outcome of the class conflict. Note that "exogenous" does *not* mean "from outer space" or "has no theoretical foundation" but simply that the system of relative prices prevailing in the economy is not sufficient to determine the rate at which labor is exploited. Formally, either the wage rate or the profit rate is sufficient to close the system of price-determining equations (For details see Pasinetti 1977).

5. See Roemer (1981) for a discussion of Okishio's theorem.

6. Formally, both the labor theory of value and Sraffa's price of production system are "reproduction theories of value." Prices in either case are defined as the sum of *costs* in contrast to neoclassical theory in which prices are determined by the intersection of supply and demand functions. In the labor theory of value, real physical costs are aggregated with embodied labor times as weights whereas the price of production system uses prices. The principal difference, at least as concerns us here, is that prices of production explicitly count profits as a cost and the labor theory of value does not. Consequently, as the rate at which surplus is extracted changes, prices of production must necessarily change while the labor embodied in commodities may well remain constant.

7. The model of this paper divides the economy into a land-based sector "agriculture" and a sector in which all means of production are produced, "industry." This specification is not intended to suggest that urban production requires no land or other nonproduced means of production. Indeed, the model can be generalized to account for any number of sectors using any number of nonproduced means of production. Some restrictions apply, most importantly, that the number of commodities, both produced and nonproduced must equal the number of production processes. Locational rents can be handled as well, as long as land in each distinguishable location is defined as a separate commodity. Note that Scott (1976, 1978), using a Sraffian framework, investigates the effects of differential rent arising from transportation costs on the pattern of accumulation.

8. Note that whether all land is assumed to be of uniform quality or that there exist perceptible (to the agents) differences is purely a matter of assumption. Whether rent is intensive or extensive cannot, therefore, be determined "endogenously." Note also that the term "technique" refers to a "set of processes" while a particular process is referred to as a "method". This follows standard conventions.

9. See Gibson and McLeod (1983) or Montani (1975) for technical details.

10. Note that the figure implicitly assumes that the no-rent land cannot produce all the required output. If so, there could conceivably exist a level of wages and profits such that it is less costly to grow all output on the no-rent land rather than on the so-called "fertile" land. In this case, the process on the rent-generating land would be truncated. Rent, since land would no longer be scarce, would fall to zero.

11. See Ball (1977, 1980) and Murray (1977-78), Fine (1979)

12. The term "differential rent" encompasses both intensive and extensive rent as discussed in the previous section. Either differential quantities of "capital" are applied to land of uniform qualities (intensive) or differential qualities of land are employed (extensive).

13. See Samuelson (1976).

14. This is precisely the kind of difficulty in "translation" anticipated in the introduction and note 3.

15. In this quotation, Marx is making the point that improvements incorporated in the soil become the property of the landlord with expiration of the lease. Competition between capitalists bids up the rent on improved land until the landlord captures all surplus profits. Consequently, longer leases favor tenant capitalists and stimulate accumulation of capital in agriculture.

16. Note that we do not present this case as a "counter example" to Okishio's theorem since we are violating an assumption under which Okishio's theorem is proved; viz. no joint production. To see that systems with intensive rent are mathematically equivalent to joint production systems, see Gibson and McLeod (1983). Our example, nevertheless, points to the possibility of a falling rate of profit, a centerpiece of Marxian fundamentalism.

17. Recall that the x-intercept is the output-land ratio and the y-intercept is the output-capital ratio. Since method 1 has the lowest output-capital ratio, it must be the more costly.

18. Formally, systems with extensive rents are not joint-product economies and this is essentially why Okishio's theorem holds.

REFERENCES

Abraham-Frois, Gilbert and Edmond Berrebi. *Theory of Values, Prices and Accumulation.* Translated by M.P. Kregel-Javaux. Cambridge: Cambridge University Press, 1979.

Ball, Michael. "Differential Rent and the Role of Landed Property," *International Journal of Urban and Regional Research* 1:3 (1977).

______. "On Marx's Theory of Agricultural Rent: A Reply to Ben Fine," *Economy and Society* 9:3 (August 1980).

Eatwell, John. "Mr. Sraffa's Standard Commodity and the Rate of Exploitation," *Quarterly Journal of Economics* (1975).

Elson, Diane. "The Value Theory of Labor," In D. Elson (ed.) *Value: The Representation of Labour in Capitalism.* London: CSE Books, 1979.

Emmanuel, Arghiri. *Unequal Exchange: A Study of the Imperialism of Trade.* Translated by Brian Pearce. New York. Monthly Review Press, 1972.

Fine, Ben. "On Marx's Theory of Agricultural Rent," *Economy and Society* 8:3 (August 1979).

Fine, Ben and Laurence Harris. "Controversial Issues in Marxist Economic Theory," In R. Miliband and J. Saville, *Socialist Register 1976.* London: Merlin Press, 1976.

______. *Rereading Capital.* New York: Columbia University Press, 1979.

Gibson, Bill. "Un enfoque diagramatico del modelo de Sraffa sobre la produccion de mercancias de mercancias," *Demografia y Economia (forthcoming)* 1983.

Gibson, Bill; and Darryl McLeod. "Nonproduced Means of Production in Sraffa's system:Basics, Nonbasics and Quasibasics," *Cambridge Journal of Economics* 1983

______. "Terms of Trade Policy in a Model with Nonproduced Means of Production," *Journal of Development Economics* 10 (1982).

Himmelweit, Susan and Simon Mohun. "Anomolies of Capital, *"Capital and Class* 6 (1978).

Kurz, Heinz. "Rent Theory in a Multisectoral Model," *Oxford Economic Papers* 30 (1978).

Marx, Karl, *Capital,* Vol. III. Moscow: International Publishers, 1967.

Montani, Guido. "Scarce Natural Resources and Income Distribution," *Metroeconomics* 27 (1975).

Murray, Robin. "Value Theory and Rent: Part One and Two" *Capital and Class* 3,4 (Autumn 1977 and Spring 1978).

Pasinetti, Luigi. *Lectures on the Theory of Production.* New York: Columbia University Press, 1977.

Quadrio-Curzio, A. "Rent, Income Distribution, and Orders of Efficiency and Rentability," In Luigi Pasinetti (ed.), *Lectures on the Theory of Joint Production.* New York: Columbia University Press, 1980.

Resnick, Stephen and Richard Wolff "Classes in Marxian Theory," *Review of Radical Political Economics* 13:4 (1982).

Roemer, John. *Analytical Foundations of Marxian Economic Theory. London: Cambridge University Press, 1981.*

Samuelson, Paul. "A Modern Treatment of the Ricardian Economy: I. The Pricing of Goods and of Labor and Land Services," Quarterly Journal of Economics 73:1 (1959).

______. "Interest Rate Determinations and Oversimplyfying Parables: A Summing Up," In Brown, Murry; Kazuo Sato and Paul Zarembka, (eds.). *Essays in Modern Capital Theory.* Amsterdam: North-Holland, 1976.

Schefold, Bertram. "Mr. Sraffa on Joint Production," privately published, 1971.

Scott, Allen. "Land Use and Commodity Production," *Regional Science and Urban Economics* 6 (1976).

______. "Urban Transport and the Economic Surplus: Notes Towards a Distributional Theory," In Anders Karlquist et al. (eds) *Spatial Interaction Theory and Planning*

Models. vol. 3 of *Regional Science and Urban Economics*. Amsterdam: North-Holland, 1978.

Shaikh, Anwar. "Marx's Theory of Value and the 'Transformation Problem' " In Jesse Schwartz (ed.) *The Subtle Anatomy of Capitalism*. Santa Monica: Goodyear Publications,1977.

Sraffa, Piero. *Production of Commodities by Means of Commodities*. London: Cambridge University Press, 1960.

Steedman, Ian. *Marx After Sraffa*. London: New Left Books, 1977.

______. "Basics, Non-Basics and Joint Production," In Luigi Pasinetti (ed.), *Lectures on the Theory of Joint Production*. New York: Columbia University Press, 1980.

______. *Fundamental Issues in the Theory of Trade*. New York: St. Martin's. 1979.