

2 On the origin of the theory of rent in economics

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A Preliminary Note:

This chapter was originally written in English, in the early 1990s, at the invitation of Professor Bertram Schefold, who at the time was, in Germany, the Chief Editor of a series of volumes on the *Klassiker der Nationalökonomie*. In such a series (of *Classics in economics*) the texts were reproduced from the original in facsimile. Each volume was then accompanied by a specific Vademecum book in German (i.e. a companion) with appropriate comments.

The present chapter was therefore translated in German and published as the leading comment (with the title *Das Vermächtnis der politisch-ökonomischen Pamphlete von 1815*, see Pasinetti, 1996) in the companion to the volume in the series reproducing the five famous pamphlets – all published in London in February, 1815 – that have traditionally been considered as the origin of the theory of rent.

The original English text was never published. It is published here for the first time, with only a few minor re-arrangements, especially at the beginning, made necessary to render it independent of the other contributions to the *Klassiker der Nationalökonomie* series.

I should like also to mention that the impact of the historical events described in the present chapter have been relevant in other directions as well, independently of the theory of rent. I resumed them, in fact considerably expanded, on two other occasions: i) in my severe critique of the so-called Law of diminishing returns, in a Lecture delivered at the Annual Meeting of the Royal Economic Society in Nottingham, March 1999 (see Pasinetti 1999); and ii) in an equally strong ‘critique of the Neoclassical theory of growth and income distribution’ conceived as a twin paper (the opposing side being taken by R.M. Solow) as prospective Encyclopedia items for the *Istituto della Enciclopedia Treccani*, then published in the *BNL Quarterly Review* (see Solow, 2000; Pasinetti, 2000).

I am glad to dedicate this paper to Alberto Quadrio Curzio, who made of Rent (framed within Piero Sraffa’s theoretical framework) the starting point of his research activity, and then never abandoned the subject of non-reproducible resources in his subsequent contributions, even when dealing with problems of economic growth, development, and international relations.

1. Five famous essays

The year 1815 – besides marking long-lasting changes in the history of the Western world – has also become noteworthy to historians of economic thought for the publication of five famous pamphlets whose impact on economic theory has gone far beyond their original aims. They appeared in the remarkably short time of 3 weeks: from 3 February (date of publication of Malthus's *Inquiry on Rent*) to 24 February (date of publication of Ricardo's *Essay on Profit*); the intermediate dates being, according to Piero Sraffa's accurate reconstruction (1954, p. 5): 10 February (Malthus's *Grounds for an Opinion*), 13 February (West's *Essay on the Application of Capital to Land*) and 24 February (Torrens's *Essay on the External Corn Trade*).

The concurrent publication of these five essays is often cited as a major example of simultaneous discovery in economic theory. They all share the differential (sometimes also, improperly, called 'Ricardian') theory of rent – both in its extensive and (with the exception of Torrens) in its intensive version – and the so-called Law of diminishing returns to land cultivation. The former has been taken as the source of the 'marginal principle' in the theory of production and income distribution, as applied to *all* factors of production, and not only to land. The latter is one of those (controversial) ideas that have influenced economic theory ever since.

2. No coincidence

In spite of first appearance, it is not difficult to realize that the publication of these five essays in those three weeks was not due to chance. As all Authors explicitly say, their pamphlets were published in anticipation of, and as a contribution to, the discussion on the Corn Bill, which was before the House of Commons. The Parliamentary debate was tabled to begin on 17 February 17; the new Corn Law was actually passed on 15 March 15.

There can be few doubts on the crucial relevance of the trade of corn – a major item in food consumption of the working class – in the second decade of the eighteenth century, in a country such as Great Britain, where the Industrial Revolution was under way and population was increasing at an unprecedented rate.

The price of corn, over the previous few decades, had increased enormously (and so had rents), though with substantial fluctuations. To give an idea of the order of magnitude, the *average* price of corn, which was 45s. *per* Winchester quarter in the 1770s, rose to 82s. in the 1800–9 decade; it peaked to the range of 150s. in 1812! But in 1813, owing to a huge harvest, it fell dramatically to the range of 70s.; it continued to fall in 1814, owing to expectations of the

consequences of the end of the war¹. Quite understandably the landlords were alarmed, and they were crying out for import protection.

In the previous years, the high price of corn (and the increased rents) had rendered the landlords an unpopular class. Both the House of Commons and the House of Lords had appointed Select Committees to investigate on the problem of the high price of corn. Their Reports were before Parliament and had become the subject of heated discussions.

All five of the essays mentioned here were part of that debate. Their authors admitted great haste and apologized for imperfections of exposition, due to the necessity of quick publication. Malthus even added a preliminary advertisement (to his first pamphlet) warning the readers that events 'have induced me to hasten its appearance. It is the duty of those who have any means of contributing to the public stock of knowledge not only to do so, but to do it at the time when it is most likely to be useful' (Malthus, 1815a, p. i). Even Torrens, who was publishing a book of 350 pages, which must have been in progress for some time, expressed in his preface 'the hope of contributing something to the right decision of a question . . . which has come before the legislature'; adding that 'the vital interest of the whole community, rendered him not unwilling to depart from . . . his original design and to conjoin controversial detail with general disquisition' (Torrens, 1815, p. XV).

West began by saying that he had been 'reading lately the reports of the corn committees', and that 'a correct understanding . . . of the corn question ha[s] induced [him] to hazard this publication before the meeting of Parliament' (West, 1815, p.1). We know that Ricardo, on his part, made a great effort, given his confessed strong difficulties in expressing himself in writing, to bring out his essay in time. He wrote it as a reply to, and in open polemics with, Malthus, hoping to bring support to the cause of unconditional free trade (in opposition to Malthus's qualified recommendation for protection).

There was therefore no coincidental discovery, but a determined effort on the part of all the authors to partake in the ongoing discussions, with the aim at influencing a Parliamentary decision reputed to be of great importance to the nation.

3. The beginning of Ricardian economics

Imminence of an important Parliamentary debate thus explains publication of those five essays in February 1815. Simultaneous *publication*, however, does *not* necessarily imply any sudden discovery. Their authors had been

¹ These data are taken from Cannan (1903, pp. 148–50). A more recent reconstruction by Mitchell (1962) differs in details, but shows the same sort of huge fluctuations. Mitchell gives the Winchester peak price at 148.50s. *per* Winchester quarter in the year 1800 (Mitchell, 1962, p. 487).

thinking about the problems under discussion for some time – perhaps for many years. Malthus – certainly a most authoritative writer – thought it expedient to convey his arguments in two separate pamphlets. The first one (*Inquiry on Rent*) is a typically academic essay – all centred on presenting a theory of rent. He says explicitly that he is using notes that had been the basis of his lectures at East India College. In the essay, the theory of rent is the central subject, while the idea of diminishing returns enters as a consequence of a dynamic application of the theory of rent to a situation in which land is given and population is growing. The second pamphlet, on the other hand, is an open statement of policy. Malthus resumes arguments given in a previous pamphlet of his, published in spring 1814 ('Observations on the Effects of the Corn Laws ...'), and states openly where he stands, giving his 'grounds of an opinion' in favour of a partial restriction on the importation of corn.

By contrast, West's pamphlet is all centred on the *Law of diminishing returns*: 'a principle of political economy ... which occurred to me some years ago', and which he found 'confirmed by many of the witnesses ... on reading lately the reports of the corn committees' (West, 1815, p. 1). In a fifty-five-page essay, the differential theory of rent only comes in the last seven pages. The exposition of the theory of rent is clear, but the focus of the essay is on diminishing returns. Sraffa (1954, p. 6) states that West's presentation of the theory of rent was independent of Malthus's. Yet, it does not seem inconceivable to me – West's essay being published ten days after Malthus's widely publicized *Inquiry on Rent* – that the last seven pages on rent might have been added at the last moment, after reading Malthus's essay, at the end of an almost-ready pamphlet basically devoted to diminishing returns.

It is also conceivable that something similar might have happened with Torrens's essay, where a differential theory of rent, in the extensive version only (as he considers, in succession, first-rate quality land, second-rate quality land, third-rate quality land, etc.) only appears in the last chapter (pp. 315–25 of Torrens, 1815).

The case of Ricardo's paper is less uncertain. He was, in a sense, a novice to economic theory discussions; he had mainly been a businessman. Up to 1813, his letters and writing had been concerned with currency questions. But in 1813 and 1814 he had passionately begun to apply his mind to the relation between the growth of capital and the rate of profits. It is in this connection, i.e. with reference, and *only* with reference, to profits that he had been applying the principle of diminishing returns to land cultivation. Sraffa (1954, p. 7) is convinced that, in this form, he had applied the principle as early as 1810 or 1811 (in his *Notes on Bentham*). Rent, however, had not entered his elaborations before February 1815. Quite clearly, when he read Malthus's *Inquiry on Rent*, he must have been, so to speak, struck by light. He read both Malthus's

essays voraciously – according to Sraffa’s reconstruction (Sraffa, 1954, p. 5), by 6 February and 13 February respectively. One can imagine how Ricardo could see all parts of his work over the previous years at last coming into place. The differential theory of rent must have appeared to him as the final missing piece that he needed to complete his mental model.

He read the other papers too, but *after* the publication of his essay (West’s by 9 March and Torrens’s by 14 March, according to Sraffa’s reconstruction; see Sraffa, 1954, p. 5). In them he found only confirmation of his ideas. As the whole picture had, so to speak, clicked together in his mind, he openly acknowledged Malthus’s contribution on rent. (When, later, he read West’s, he also added West to Malthus as deserving recognition of priority on the theory of rent – see the preface to his *Principles*; Ricardo, 1817.)²

Reading all these essays at a distance of almost two centuries, it strikes me as remarkable how Ricardo’s essay is decisively towering over all the others. Malthus’s essays are very ably laid out and finely argued, but they are concentrated on rent. West’s and Torrens’s essays are competent arguments on the issues at stake; yet in their concern on diminishing returns and on the corn trade they are clearly dated. Ricardo’s essay is quite different. It really is remarkable for the completeness of the theoretical framework on the basis of which he carries out his arguments. Ricardo begins with rent straightaway and links it up with profits; he continues with growth of population and capital, and links them up with diminishing returns. He really is able to bring together all the pieces one by one, in a remarkably complete, logically consistent theoretical scheme, in which the various elements appear as coherent parts of a whole scheme of a working economy. Though the details were to become much clearer only two years later in his *Principles* (Ricardo, 1817), one can see here already a theory of production, a theory of income distribution, a theory of relative prices (agriculture versus manufactures) and most of all a dynamic theory concerning the movement through time of a capitalist economy.³

It is this remarkably complete model that leads him to the sad conviction of a tendency towards a stationary state. And it is this eventuality that leads him to argue very powerfully and passionately for free external trade of corn, as the way to avoid an otherwise gloomy course of events in which growth of

² This was not enough to satisfy West, who – after Ricardo’s death – made strong claims for himself, mainly with reference to the law of diminishing returns (see his ‘Introduction’ in West, 1826). ‘His evident resentment against Ricardo was probably unjustified’, Schumpeter writes (1954, p. 476). Cannan is even severer with West’s complaint, which he considers ‘quite unfounded’ (Cannan, 1903, p. 280).

³ The richness of Ricardo’s framework is so remarkable as to have stimulated many modern economists to shape it in the form of a rigorous mathematical model. I myself gave a formulation of it in my *Mathematical Formulation of the Ricardian System* (Pasinetti, 1960). The reader may look at this mathematical formulation, a simplified two-commodity version, as an aid to interpret Ricardo’s 1815 essay.

population, increase of rent, fall of the rate profits, and compression of wages towards subsistence would only lead, in the long run, to the misery of a stationary state.

The importance of Ricardo's essay is unquestionable. It was the beginning of an intense correspondence with contemporary economists who urged him to be more exhaustive; he responded by putting to task all the energies he had available. From the intention of writing a second edition of this essay sprang his major work, the *Principles of Political Economy and Taxation* (Ricardo, 1817).

That 1815 essay was the beginning of Ricardian economics.

4. Impact on economic theory

But quite apart from the beginning of Ricardian economics, which was an event on its own, there can be no doubt that the impact of those five essays on the development of political economy was enormous.

Ever since, the differential theory of rent has remained a milestone in the history of economic analysis. Adam Smith had been confused, and even contradictory, on the subject of rent. By 1815, all influential scholars became convinced that political economy had at last been enriched by a solid theory of rent. No longer did rent appear as a sort of 'monopoly price', as Adam Smith had called it, but a necessary technological consequence of the fact that high-quality land is scarce, and in general that the given natural resources, for sheer technological reasons, yield different productivities and thus differential gains.

It must be pointed out, however, that this theory of rent was not original. James Anderson, in his work *Enquiry into the nature of the Corn Laws with a view to the new Corn Bill proposed for Scotland*, published in 1777, had anticipated it, and very clearly so.

His famous passages have been reprinted in many places: for example, in McCulloch's edition of the *Wealth of Nation* (McCulloch, 1828, p. 45) and in Cannan (1903, pp. 371–2). They are too long to be reproduced here; of interest to readers, however, may be yet another passage of his on rent, from another of his work: *Observations on the means of exciting a spirit of National Industry*, also published in 1777:

In every country there are various soils, which are endued with different degrees of fertility; and hence it must happen that the farmer who cultivates the most fertile of these can afford to bring his corn to market at a much lower price than others who cultivate poorer fields. But if the corn that grows on these fertile spots is not sufficient fully to supply the market alone, the price will naturally be raised in that market to such a height as to indemnify others for the expense of cultivating poorer soils. The farmer, however, who cultivates the rich spots will be able to sell his corn at the same rate in the market with those who occupy poorer fields; he will, therefore, receive much more than

the *intrinsic* value for the corn he rears. Many persons will, therefore, be desirous of obtaining possession of these fertile fields, and will be content to give a certain premium for an exclusive privilege to cultivate them; which will be greater or smaller according to the more or less fertility of the soil. It is this premium which constitutes what we now call *rent*, a medium by means of which the expense of cultivating soils of very different degrees of fertility may be reduced to a perfect equality. (Anderson, 1777a, p. 376)

It is interesting to note that this passage was part of a criticism in which Anderson implicated Adam Smith. Yet he did not explicitly point out that Smith was incorrect, and Smith (who must have seen Anderson's criticism, as Cannan points out – see Cannan, 1903 p. 221) did not correct his theory. James Anderson's remarkable theory was thus simply (and sadly) missed.

The differential theory of rent remained dormant, only to be re-discovered and hailed as a great contribution in 1815, when it was presented in conjunction with the Law of diminishing returns.

An important point to stress is that James Anderson had always been a strong opponent of the idea of diminishing returns to cultivation of land. His opposition was not based on any abstract reasoning; it came from personal experience: he was a farmer and an experienced agriculturist. As all farmers, he was in favour of protection, but on the basis of an unusual argument. He thought that protection would indeed force inferior lands into cultivation, but these inferior lands would eventually be made as productive as the other (originally more fertile) lands. He was a strong believer in agricultural progress and indefinite increasing returns. The point is worth mentioning as it shows, incidentally, that the differential theory of rent and the Law of diminishing returns are quite separate theories and do not imply each other.

When Malthus published his *Essay on the Principle of Population* (1798), James Anderson was among his strongest critics (see Anderson, 1801). Malthus had presented his *Principle of Population* on the rather weak theoretical ground that there is an inconsistency between a natural 'geometric' progression of population growth and a factual 'arithmetical' progression of the means of subsistence. It was precisely in replying to Anderson's criticisms, in the 2nd edition of his *Principle of Population* (1803) as Edwin Cannan (1903, p. 146) points out, that Malthus developed, in a rather casual way, an argument that implied the principle of diminishing returns, but applied in reverse.⁴ It took some time before the idea dawned clearly in his mind.

The same must have happened to West, Torrens and Ricardo, though at various stages, before 1815.

⁴ See Malthus (1803, 2nd ed., p. 472). Malthus considers the case of an accidental de-population, quite logically remarking that, in such an event, cultivation would be abandoned on the least fertile lands.

In any case, it is only with the publication of the five essays in February 1815 that the Law of diminishing returns to land cultivation becomes a clear, explicitly stated principle of political economy.

Again we might ask: why in February 1815?

It was stated earlier that the five pamphlets were all published in February 1815 in order to contribute to, and to influence, a decision that was about to be taken by the House of Commons. Now we can look at the other side of the coin. All authors had read, very carefully, the Reports of the Committees of Inquiry on the corn question. From these Reports, one can see very clearly what had happened in England in the previous decades. The Industrial Revolution had been associated with an unprecedented growth of population (in fact, *more* than in 'geometric' progression). This, coupled with the Napoleonic wars and the inevitable difficulties of importation of corn, had caused a rapid increase of demand for food, which had led to expansion of agricultural production, through the passing of a succession of 'enclosure acts', in order to extend cultivation to formerly uncultivated lands. The obvious consequences had been a higher price of corn and higher rents.

To see 'diminishing' returns in this process was simply a rationalization of factual historical events: actually of a historical circumstance, which was characteristically typical of a specific country (England) and of a specific period of time (late eighteenth and early nineteenth centuries).

Incidentally, but very significantly, it must also be noticed that, from a purely analytical point of view, the principle of diminishing returns suited Malthus's theory of population very nicely.

In the place of the earlier weaker arguments on 'geometric' versus 'arithmetic' progressions, a scientific principle could be presented, which allowed Malthus to assert that, as the number of people increase, it is true that 'a pair of hands comes with every mouth', but while the new mouths require as much food as the old, the new hands produce less and less. Ricardo, on his part, turned this into a powerful argument against protection. Free trade of corn would stop extension of cultivation to less productive lands and hence divert production potential to manufactures, where all agreed that diminishing returns would not apply.

Factual historical evidence and analytical convenience seemed to go hand in hand.

The differential theory of rent – which had been ignored as long as it had been proposed (by James Anderson) within a static framework – became a powerful analytical tool when it was applied in a dynamic scheme, in which extension of cultivation of land is coupled with diminishing returns to scale. For the emerging science of political economy this marked a turning point.

5. The 'Law' (or pseudo-Law?) of diminishing returns

But how accurate, or how reliable, or how meaningful is a 'Law' of diminishing returns?

One has a pretty good idea of what is meant by a 'law' in physics. The 'law of gravitation', for example, is a universal law expressed by a formula that describes how bodies fall in ideal conditions of no attrition. On the 'Law of diminishing returns', however, no one would say that it expresses in any way any 'ideal' condition. It rather expresses how an economy moves in *hypothetical* conditions. The hypothesis is that technology does not change, or changes at a speed that is insufficient to prevent a fall of productivity as production is expanded.

In fact, not one of the authors we are considering asserts that diminishing returns represent a universal principle. To begin with, they present it *only* for agricultural production. This is an important point. They all imply that, in manufacturing production, the opposite is the case, namely that productivity is increasing. Moreover, they admit that technical progress goes on in agriculture as well, but not at a sufficient speed.

Ricardo, in his essay, is the most logically consistent of all. He is always very careful in *not* denying that 'improvements might take place in agriculture' (1815, p. 11); however, at the same time he is convinced that they would not proceed at a sufficiently speedy pace. Therefore (quite remarkably from an analytical point of view), he explicitly says that, for clarity, he leaves them aside. He cuts short all hesitations: 'We will, however, suppose that no improvements take place in agriculture, and that capital and population advance in the proper proportion' (1815, p. 6). In this way, absence of technical progress in agriculture becomes an explicit *assumption*. Once this assumption is granted, even the simple two-commodity version of Ricardo's model (with an agricultural good and a manufactured good) is by itself sufficient⁵ to show how all of Ricardo's conclusions logically follow, as 'capital and population advance in the proper proportions'. He obtains in logical succession: lower-fertility lands brought into cultivation, higher rents, lower rate of profits, higher price of corn, movement towards the gloomy conditions of a stationary state, with wages compressed at subsistence, profits at their minimum, rents at their highest. And he concludes:

It follows then, that the interest of the landlord is always opposed to the interest of every other class of the community . . . High rents and low profits, for they invariably accompany each other, ought never to be the subject of complaint, if they are the effect of the natural course of things. (Ricardo, 1815, p. 20)

⁵ This can be seen clearly in Pasinetti (1960).

The relevant point to note is that technical progress in manufactures, *however pronounced it may be*, does not make the slightest difference to Ricardo's conclusions. For, it is the process of production of the agricultural good that acts as a bottleneck.

The way out, for Ricardo, is free external trade. If corn is imported, the country will specialize in manufactures, and the process of diminishing returns (as it only affects agriculture) will be brought to a halt!

The argument is incontrovertible; but it stands on the crucial *hypothesis* of no (or in any case insufficient) technical progress in agriculture.

This can hardly be said to be a 'universal law'. In spite of what some interested witnesses might have said in their testimonials at the Corn Committees, many – and James Anderson was one of them – would claim that it was not even the case in England at that time. Cannan (1903, p. 152) remarks that diminishing returns can be seen as denied even in statements of the Chairman of the Committee (Sir Henry Parnell).

Unlike the theory of rent, the Law of diminishing returns in agriculture did not meet general acceptance, even at the time it was presented.

Notable examples of strong critique are those by Thomas Chalmers, in England, and by H. C. Carey (1837), in the United States. Chalmers, in his *Political Economy*, argued at length that 'The doctrine or discovery . . . promulgated by Sir Edward West and Mr. Malthus . . . that the land of greatest fertility was first occupied . . . is not accordant with historical truth' (Chalmers, 1832, chap. I, 2–6). Carey on his turn, in his *Political Economy* (1837), insisted on pointing out that *precisely* the way in which the Law of diminishing returns was illustrated by both West and Ricardo, namely by the process of starting cultivation on the most fertile land in a newly settled country, was contradicted by historical facts. Certainly that was *not* the way in which things happened in the United States.

Yet, in spite of criticism and opposition, the Law of diminishing returns immediately became one of the cornerstones of nineteenth century mainstream political economy. James Mill, in his *Elements of Political Economy* (1821) immediately expounds the Law of diminishing returns as a general rule, without even mentioning the possibility of new discoveries or improvements. And when his son, John Stuart Mill, wrote what came to be considered the synthesis of classical theory – his *Principles of Political Economy* (1848) – he presented the 'Law' in a chapter headed 'Of the Law of the Increase of Production from Land', warning that 'This general law of agricultural industry is the most important proposition in political economy. Were the law different, nearly all the phenomena of the production and distribution of wealth would be other than they are' (Mill, 1848, 1st edn, vol. I, p. 212). But John Stuart Mill must have felt uneasy, and not at all on solid ground, as is proved by the fact that he kept on modifying his presentation of the 'Law' in the successive

editions of his *Principles*. In examining the succession of John Stuart Mill's many qualifications, Edwin Cannan points out that Mill ends up by admitting a surprisingly high number of exceptions. Cannan concludes:

we should be at a loss to conceive why Mill should be at the trouble of developing a law which: 1) does not operate in the very early date of the history of society; 2) is liable to temporary supersessions; 3) has been made head against by an antagonizing principle, namely the progress of civilization, throughout the whole known history of England (Cannan, 1903, p. 177).

But what kind of 'Law' can this be? No wonder Cannan ends up by calling it 'The pseudo-scientific law of diminishing returns' (p. 181), pointing out that it is based on 'pseudo-historical characteristics' (Cannan, 1903 p. 175).

Yet it became generally accepted. The effect of it all was to generate unjustified pessimism on the future of industrial economies.

Interestingly enough, this unjustified pessimism, which characterized the political economy that came out of the Malthus–West–Torrens–Ricardo essays, was perhaps better perceived by external observers rather than by the internal practitioners of the new science.⁶ Thomas Carlyle, the Scottish poet and writer, was quick in noticing a contrast between the actual possibilities of progress and the gloomy conclusions of the economists. His epithet, defining political economy as the 'dismal science', has become famous.

6. Extensions of the theory of rent and their crucial consequences

The idea that technical improvements would not be strong enough to win the terrible curse of the scarcity of natural resources, and in particular of land, shaped the minds of economists for the whole of the nineteenth century.

Even Marx, the theorist of historical change, was not able to escape from such an idea. Unlike all classical economists, he (unconvincingly) rejected the differential theory of rent, mixing up rent and profits, and considering them all as being parts of surplus value and exploitation. In so doing, however, he fell into the trap of applying diminishing returns to capitalistic accumulation in general, and not only – as the classical economists had done – as a consequence of extension of cultivation of land. The Law of diminishing returns was thus transformed into a 'law of the falling rate or profits' *tout court*, which turned out to be one of his major blunders.

One might say that, most significantly in this respect, the marginalist economists, at the end of the nineteenth century, ended up falling exactly into

⁶ Later on, among historians of economic thought, Schumpeter was perhaps the most perspicacious of all in pointing it out, though in the middle of many other hints in various directions (Schumpeter, 1954, pp. 570–4).

the same trap. They converted the ‘marginal principle’, which the classical economists had applied to land only, into a *general principle*, to be applied to all factors of production.

This is something that the classical economists would never have done. In their elaborations – as is evinced most clearly by Ricardo’s scheme – the differential theory of rent served the purpose of *separating* the effects of extension of production on land (where diminishing returns were supposed to prevail) from those of extension of production in manufactures (where constant or increasing returns were taken for granted). By extending the marginal principle outside the processes of land cultivation, the marginalist economists automatically and imperceptively carried *beyond* such processes precisely those characteristics that the classical economists had carefully confined to land.

The consequences of this diversion from classical economics were of paramount importance. As the process of industrialization, in the second part of the nineteenth century, began to spread from England to Western Europe and to the United States, the emphasis of economic theory was bound to shift from agricultural production to industrial production. Capital accumulation, rather than extension of land cultivation, became the central subject of economic investigation. It should have needed specifically invented tools of analysis, suited for its particular characteristics; it underwent instead an extension of analytical tools that had been invented for land cultivation.

Böhm-Bawerk, the principal mainstream theorist of capital, conceived capital accumulation as an increase in the ‘roundabout methods’ of production, which he tried to express in terms of an increase of the ‘average period’ of production. It should be noted that, in this version, the marginal principle and the principle of diminishing returns became undistinguishable parts of the same conception.

This put into motion a series of *analytical* adaptations, which proceeded from two opposite sides. On the one side, the principle of marginal land had to be shaped in such a way as to suit the characteristics of all other factors of production, which led to the application of the marginal principle *only* in its intensive version. The principle of diminishing returns was thereby shaped in the form of diminishing returns to changing proportions, associated with variations in the opposite direction, of the factor prices (the growth of capital with respect to labour causing a fall of the rate of profits). This was interpreted as the process of *substitution* of capital for labour – indeed an important process but very peculiarly presented at a *constant* state of technical knowledge. On the other side, a series of *assumptions* were introduced in order to assimilate the characteristics of all factors of production (and, most of all, of capital) to the characteristics of land.

Knut Wicksell, adding rigour to Böhm-Bawerk's theory of capital, enshrined the relation among the factors of production in what later became known as the 'neoclassical production function', in which all factors enter production on exactly the same footing. This conception of production, which has dominated economic theory up to our own days, required an *analytical* (not a factual) distinction between two types of changes of returns: i) changes due to variation of the *scale* of production, at constant factor proportions; and ii) changes due to variations of the *proportions* among the factors of production (supposed to represent the process of substitution of capital for labour).

In theory, the first process of variations might yield constant, decreasing or increasing returns, but in general increasing returns have been excluded, by *assumption*. The second process of variations had to be conceived as going opposite to changes in factor prices, again, by assumption, as convexity of the production function is – *not* an observed fact – but a necessity of the theory.

The theory of income distribution was associated – without any explicit justification – *only* with the second process of variations (i.e. with the variations of the factor proportions).

It sounds in fact extraordinary that the theory of production should have proceeded on such important questions simply by an analytical process of, bit by bit, extension, and of assumptions, introduced on the basis of convenience, *not* on the basis of observation or logic!

This analytical process has proceeded a long way indeed, in spite of it going, quite clearly, against what Malthus, West, Torrens and Ricardo intended at the beginning. It was no doubt strongly favoured and propitiated by the parallel development of the notion of marginal utility in the theory of consumption.⁷

Now and then, there have indeed been oppositions to such extensions, but they have not been successful within the profession of economists. In the 1960s, a controversy on capital theory flared up, at the end of which everybody had to agree that the assumption of diminishing returns to changing proportions, when applied to capital and labour, has no logical foundation. In general, there exists no monotonic association between variations of the *proportions* of capital to labour (or of capital to land or to any non-produced factor of production) and the rate of profits. The implication is that the *extension* of the marginal principle of income distribution to *capital* and labour (or to capital and land) has no logical foundation. More in general, and more specifically, the assumption of a general 'well-behaved' (as it has been called) production function is totally unwarranted. (See Pasinetti *et al.*, 1966.)

⁷ It may well remain an open question whether the generalization of the marginal principle was mainly due to extension of the theory of rent in production theory or to the development of the notion of marginal utility in the theory of consumption. There is in any case no doubt that the two developments reinforced each other.

What is indeed surprising is that uncritical acceptance of diminishing returns to changing proportions as applied to capital remains very widespread. The results of the 1966 discussions on capital theory are generally ignored. In most of the economics textbooks and in most of the papers appearing in what are today's reputed and prestigious economic journals, mainstream economists are freely using production functions involving Labour and Capital with decreasing returns to changing proportions, apparently without the slightest doubt as to their appropriateness, and most of the time even without giving the slightest warning or information on previous criticisms and discussions.

Of all this – it must be stressed – the authors of the five 1815 essays in political economy are entirely innocent.

7. Technical progress versus limited natural resources

Ricardo could never have imagined that an innocent *assumption* ('We will, however, suppose that no improvements take place in agriculture . . .', Ricardo, 1815, p. 6), that so well served him in the analytical purpose of isolating the field of diminishing returns (agriculture) from that of constant or increasing returns (manufacturing), would generate such long-term effects. His assumption was meant to be confined to production on land. Obviously he could not anticipate, even less prevent, the use that later economists would make of it.

Once the assumption of no technical progress was extended to production in general, the effect was that, with the exception of a few isolated cases, technical change disappeared from economic analysis for more than a century.

Only in the post-World War II period have economists rediscovered the relevance of technical progress and have begun to reintroduce it, at first timidly then with force, into economic investigations. But re-introducing technical change, after a century and a half of economic analysis based on the assumption of a stationary technology, has not proved to be easy at all.

The re-discovery of technical progress effectively began with Roy Harrod's (1948) very simple device of considering a rate of productivity growth, side by side to the rate of population growth, in his macro-economic model. But Harrod's simple device could not be taken as proposed. When empirical research created a shock by revealing that almost all the growth of production per man that had taken place in the first half of the twentieth century was due to a 'residual', i.e. to something that had not been considered and which could not be but technical change, the response was *not* an adaptation of economic analysis to such newly discovered and astonishing evidence, but further *assumptions* about how the facts would have to be in order to fit them into the pre-conceived theoretical scheme. The conception of capital accumulation,

based on the distinction between changes of scale at constant returns and changes of factor proportions, was not modified. Instead, a *third* element of change was superimposed on the others, in the form of a 'shift' through time of the production function.⁸ The arbitrary nature of the resulting tripartition was never put into question, in spite of it not even being exhaustive; so much so that, in the latest versions of neoclassical 'new growth models', also increasing returns are introduced, with the consequence of having to appeal to imperfect competition in order to make the model logically consistent.

Nevertheless, one must acknowledge that, at last, an enormous outburst of economic research concerning technical progress (in many of its aspects: inventions, innovations, diffusion of knowledge, etc.) has taken shape in the last few decades. Economists seem at last to have woken up to the necessity and importance of investigating the effects of technical change – under an impulse that has mainly come from outside, and most of the time against, mainstream economics.

The situation is quite puzzling. According to logic, one should expect that the investigation of the economic consequences of technical progress be carried out with reference to the characteristics and specificities of the phenomenon to be investigated, namely *technical change*, without of course precluding the possibility of resuming, at the appropriate place, the other sources of production and of growth. In practice, within the framework of mainstream economics, this has been revealed to be something very difficult to achieve.

Is there, perhaps, something else, or further, that may be learnt from the authors of the 1815 pamphlets?

Let me note that they clearly perceived two important features of the problem they faced. First of all, they realized that, with a growing population, the economic future of humankind would be decided by the prevalence of one of two opposing trends: the improvements of technology and the increasing limitations and constraints of Nature. Secondly, they perceived (an aspect that can be seen extraordinarily well in Ricardo) that, for analytical reasons, they had to make a choice and concentrate on one of the two trends, hopefully the most important one.

By dramatic under-estimation, they made the wrong choice.

⁸ The standard reference is Solow (1957), who estimated that the change of productivity in the US economy, 1909–49, was due 87.5% to the 'residual', re-interpreted as a 'shift' of the production function, and 12.5% to increased proportion of capital to labour (i.e., increased capital intensity). I was the first to criticize strongly these results (Pasinetti, 1959), pointing out how arbitrary the assumptions were behind the various distinctions. More specifically and very simply, I pointed out that, by using the same data used by Solow, from 1909 to 1949, the capital-output ratio in the US economy decreased from 2.75 to 2.20. Hence, in that period, capital intensity *decreased*, not increased as Solow's model implied.

Yet, the following economists did not correct them; on the contrary they exasperated the effects of that choice, effectively ending up with changing the original content of economics itself. From a science that inquires into the nature and causes of the wealth of nations, as it was intended by the Classics, they made it (as Lionel Robbins, 1932, could conclude a century later) a science that deals with the use of scarce means to achieve given ends.

Nobody can obviously deny that, in taking advantage of our increasing technological knowledge for the production of the wealth in our time, we face today, as no less than two centuries ago, the task of how to allocate with efficiency and judiciousness and according to our choices (individual and social), the natural resources that we have inherited, at the same time preserving the environment that our marvelous planet is endowed with. But *increasing* technical knowledge implies that – even with given natural resources – the *constraints and limitations are not given*: they are moving all the time!

A kind of contrast and opposition seem to have emerged. Super-imposing now an economics that deals with an evolving technology, on top of a solidly pre-established, pre-developed economics that deals with the characteristics of an efficient management of scarce resources at a given technology, seems to reveal a sort of profound difficulty. Assumptions become necessary more in order to eliminate contradictions than in order to facilitate investigation.

In such a situation, the 1815 essays in political economy prompt a challenging thought.

Why not go back to where Malthus, West, Torrens, and Ricardo began, and radically change their starting hypothesis? If history has revealed that their original choice was mistaken, the obvious course to take would seem to be to reverse that choice. Granted that *analytical* reasons impose, as they realized, that we should focus, *at least at the beginning*, on only one of the two trends, we may well begin by developing a political economy based on progress of technical knowledge alone,⁹ rather than, as has happened, on scarcity of given resources alone.

Once the most important factor (technical change) behind the wealth of nations has been appropriately investigated as such, without the risk of stifling the efforts with possibly contradictory features imposed by other, pre-shaped, frameworks of analysis, it may well turn out to be easier, at a later stage of investigation, to introduce the integrations and complications connected with the limitations of Nature, rather than insisting on a course of analysis that has done the opposite so far – with many complications and little reward.

⁹ This proposal is not made in the abstract. To provide a complete model in which the increases of production are entirely due to growth of labour productivity and the variations in output proportions are due to individuals' and social choices in consumption patterns is indeed possible. I showed it myself at the time I was writing the present chapter (see Pasinetti, 1993).

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