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Izumi Hishiyama, Commentary: Sraffa's Position in the History of Economic Thought and the Significance of his Study of Ricardo

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Introduction by Junsuke Miyamoto

In 1956 Izumi Hishiyama and Yoshihiro Taguchi translated two essays by Piero Sraffa, 'Sulle relazioni fra costo e quantità prodotta' (1925) and 'The Laws of Returns under Competitive Conditions' (1926), and published them, with the addition of commentary by Hishiyama, as *Keizaigaku ni okeru Koten to Kindai—Shinkotengakuha no Kentō to Dokusenriron no Tenkai* (*The Classical and the Modern in Economics*: *The Examination of the Neoclassical School and the Development of Monopoly Theory*, Tokyo: Yuhikaku) in the same year. It is the commentary by Hishiyama included in this book, 'Sraffa's Position in the History of Economic Thought and the Significance of his Study of Ricardo,' that has been translated into English here.

Izumi Hishiyama (1923–2007) began his work as a scholar with the study of François Quesnay's *tableau économique*, and the results of these efforts were brought together in 'The Tableau Économique of Quesnay: Its Analysis, Reconstruction and Application' (*Kyoto University Economic Review*, April 1960). This work received international acclaim as the first thoroughgoing attempt at a dynamic treatment of the *tableau économique* model. Later, Hishiyama encountered Sraffa's essay 'Sulle relazioni fra costo e quantità prodotta,' which made a profound impression on him, and through the intermediary of Sraffa developed an interest in classical school economics centred on David Ricardo, on the one hand, and the economics of Alfred Marshall and the Cambridge

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school, on the other. On the basis of an approach that involved reviving the ideas of the classical school in modern economics, Hishiyama presented a large amount of excellent research ranging from the economics of the classical school to the economics of his day. He is renowned in particular as a pioneer of Sraffian economics in Japan, and in 1962 published, together with Hiroshi Yamashita as his co-translator, a groundbreaking Japanese translation of *Production of Commodities by Means of Commodities: Prelude to a Critique of Economic Theory* (1960), one of Sraffa's most important works. In 1993 he published *Sraffa Keizaigaku no Gendaiteki Hyōka* (*A Modern Evaluation of Sraffian Economics*, Kyoto: Kyoto University Press), a text that can be described as one of his most significant works, in which he considered Sraffa's economics from a multi-layered perspective and attempted to establish his contribution to modern economics.

Let me briefly touch on the evaluation of these two essays by Sraffa in the context of the history of economic thought. The first essay, entitled 'Sulle relazioni fra costo e quantità prodotta,' was published in the *Annali di Economia* in 1925. Sraffa's first major achievement in the field of economics, this essay aimed to restore the position of Ricardian theory through a critique of the Marshallian theory of value, namely, the theory of demand–supply equilibrium, and was praised as a superlative work in this field. Recognising the high praise, this essay had received, John Maynard Keynes, then the editor of the *Economic Journal*, asked Sraffa to contribute an English summary of it to this publication. Sraffa agreed, and 'The Laws of Returns under Competitive Conditions' was published in the *Economic Journal* in 1926. Not stopping at a summary of the 1925 essay, this text also included new content. This additional content addressed the problem of how to explain the phenomenon of diminishing costs of individual companies widely seen in actual markets on the basis of the partial equilibrium of a given industry and long-term framework implied by the Marshallian approach. This essay too had a major impact on the field, and provided the trigger for the 'Cambridge cost debate' that was centred around the Cambridge school scholars of the day such as Dennis Robertson, and Gerald Shove who took up the theme of competitive equilibrium under diminishing returns. Joan Robinson's *The Economics of Imperfect Competition* (1933) was one of the results that emerged from this debate. Sraffa's 1926 essay opened up the path to the theory of imperfect competition, but Sraffa himself stated in a letter to Hishiyama in 1955 that 'I am less dissatisfied with this [1925] essay than with the English [1926] essay' (Hishiyama 1993, 8), and with this comment can be seen as having considered the earlier work the more important of the two.

Here I will focus on the 1925 essay and discuss its significance with reference to Hishiyama's commentary. Three points can be raised regarding the

implications of this essay. First, it clarified the fact that Marshall's theory of demand–supply equilibrium did not belong to the lineage of Ricardo's original theory. At the beginning of the essay Sraffa writes as follows.

> The idea of interdependence between quantity produced and the cost of production of a commodity produced under competitive conditions is not suggested by experience at all and could not arise spontaneously. It can be said that all classical writers accept implicitly, as an obvious fact, that cost is independent of quantity, and they do not bother to discuss the contrary hypothesis. This idea of interdependence has taken shape recently, in an indirect way, as the result of the change in the basis of the theory of value, from cost of production to utility. It should not be surprising that, while for a long time people have continued to talk of cost as being independent of quantity produced, as soon as utility was subjected to a methodical analysis it was seen that of necessity the utility of a commodity depends on the available quantity of that commodity.
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> The《demand function》is based on an elementary and natural hypothesis, that of decreasing utility. Whilst in production the functional relationship is the result of a much more complicated set of hypotheses. The fact remains that only *after* the studies of marginal utility had called attention to the relationship between price and quantity（consumed）, did there emerge by analogy the symmetrical conception of a connection between cost and quantity produced.　（Sraffa［1925］1998, 325）

Focusing on differences in how they thought about cost and quantity produced, Sraffa argued that there was a fundamental difference between the classical and neoclassical schools of economics in their frameworks of economic analysis. It is not the case, however, that this assertion has been widely accepted in modern economics, and in particular within its mainstream school of thought. Samuel Hollander, for example, writes as follows in the conclusion of his *The Economics of David Ricardo*.

> In the light of these considerations it would appear that the contrasts between Ricardian and neo-classical procedures are not such as to justify the notion of two separate streams of nineteenth-century thought. To say this is not, however, to suggest an *identity* of procedure and certainly not an identity of preoccupation. It is to suggest rather the sharing of a common heritage or 'central core,' which amounts largely to allocation theory and the mechanisms of demand–supply analysis.　（Hollander 1979, 683–84）

Hollander's assertion that the classical and neoclassical schools share a way of thinking in which an efficient resource allocation is accomplished by the mechanisms of demand–supply can be considered representative of the beliefs of most neoclassical economists, but it is incompatible with Sraffa's view.

Second, Sraffa clarified the fact that, in the context of determining the price of individual commodities, Marshall's theory did not stand upon a solid, rational grounding. The determination of price by demand and supply curves is the foundation of the neoclassical school of economics. But Sraffa asserts that one of these pillars, the supply curve, lacks rational grounds. Here let me quote a passage from the concluding section of his essay.

> There are then strong reasons, of which we have tried to show the most prominent, why, apart from exceptional cases, non-proportional cost curves cannot be involved in the determination of the particular equilibria of single commodities in a static system of free competition, without assumptions being introduced that contradict the nature of the system. An essential condition is to totally isolate the industry that produces the commodities considered from all other industries. Now, for increasing costs, it is necessary to take into consideration the whole group of industries that uses a given factor of production. For decreasing costs we must consider all groups of industries that reap an advantage from certain《external economics》. These causes of variation of cost, highly important from the point of view of general economic equilibrium, must of necessity be considered to be negligible in the study of the particular equilibrium of an industry. From this point of view, which constitutes only a preliminary approximation to reality, we must then concede that, in general, commodities are produced under conditions of constant costs. (Sraffa [1925] 1998, 363)

Throughout his 1925 essay, Sraffa rigorously argues that the law of increasing/diminishing returns (that is, a U-shaped cost curve) lacks rational grounds. In spite of this claim of Sraffa's, however, the U-shaped cost curve was preserved with its theoretical grounding left unclear.

Third, starting from his criticism of Marshall (his criticism of the law of non-proportional returns), he connected this to the restoration of classical school economics (Ricardian economics), something that at first glance might seem unrelated. If the law of non-proportional returns does not have a theoretical grounding, the remaining assumption is constant returns. According to Hishiyama, Sraffa interpreted Ricardo from the perspective of Marshallian partial equilibrium analysis. From this point of view he asserts that the constant returns thesis must be considered in connection with Ricardo's problem of an

invariable measure of value（see 85 seq.）. This seems to be a controversial assertion. At any rate incorporating the assumption of constant returns into the system of the classical school of economics is not problematic. This was the case because Sraffa himself states as follows at the beginning of his *Production of Commodities by Means of Commodities.*

> Anyone accustomed to think in terms of the equilibrium of demand and supply may be inclined, on reading these pages, to suppose that the argument rests on a tacit assumption of constant returns in all industries. If such a supposition is found helpful, there is no harm in the reader's adopting it as a temporary working hypothesis. In fact, however, no such assumption is made. No changes in output and . . . no changes in the proportions in which different means of production are used by an industry are considered, so that no question arises as to the variation or constancy of returns. The investigation is concerned exclusively with such properties of an economic system as do not depend on changes in the scale of production or in the proportions of 'factors.'
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> This standpoint, which is that of the old classical economists from Adam Smith to Ricardo, has been submerged and forgotten since the advent of the 'marginal' method.　（Sraffa 1960, v）

In other words, in *Production of Commodities by Means of Commodities* Sraffa goes one step further than his 1925 essay, discarding the hypothesis of constant returns, assuming the classical school system in which neither the quantity of production nor production factors change, and attempting to make a thorough argument for the possibility of determining various prices even under such assumptions. Starting from the proposition of constant returns, after further consideration he can perhaps be said to have achieved his original aim of reviving classical school economics in *Production of Commodities by Means of Commodities.*

Hishiyama attempted to raise the evaluation of Sraffa in Japan to an appropriate level and engaged in this commentary on his essay. Here, I will point out three of Hishiyama's contributions. First, he did not stop at merely introducing Sraffa's essay, but undertook a detailed examination of the law of non-proportional returns that it addressed and elucidated the background of economic history from which Sraffa's essay had emerged. For example, he showed on the basis of various documents that the U-shaped cost curve was not born out of the Marshallian tradition, but rather was formed by Enrico Barone of the late period Lausanne school and brought to Cambridge via Sraffa（see 62–63）. Second, writing in 1956 he had accurately predicted the course of Sraffa's theoretical

development that had begun in his 1925 essay, advanced through his editor's introduction to the collected works of Ricardo (1951), and would culminate in his *Production of Commodities by Means of Commodities* (1960). Such was Hishiyama's insight. In order to decipher Sraffa's essay, Hishiyama also read an extraordinary number of related texts, and as a result provides the reader with a document that takes an objective view of the significance of Sraffa's essay and the state of economics at the time. This was his third contribution.

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〈Explanatory Notes〉

1. Text in [ ] in Hishiyama's writing was inserted by the translators.
2. Some references that Hishiyama mentioned in the original text have been omitted from this translation.

I Two Intellectual Trends in the Neoclassical School

After the First World War, faced with the realities of monopolies and unemployment, the neoclassical school[1] is said to have plotted a theoretical ecdysis in two directions.[2] One was an approach that directly addressed the question of how to incorporate monopolistic elements into the system of equilibrium price analysis,

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1 While it presumably needs no introduction, the neoclassical school was a school of thought founded by Alfred Marshall and developed mainly at the University of Cambridge. Taking up the Marshallian tradition, its members attempted to continue the development of Marshall's system while operating from a very realistic perspective and adopting a very liberated stance in relation to issues raised by other schools. Leading figures in this school include, among others, Dennis Robertson, Arthur Pigou, John Maynard Keynes, and Joan Robinson. John Hicks cannot be included in this school without reservations, but he is a figure who cannot be ignored when thinking about the theoretical ecdysis of the neoclassical school.

2 See Shigeto Tsuru, *Keizaigaku he no Hansei* (*Reflections on Economics*), 1950, pp. 7–23.

and, after various twists and turns, ultimately led to the reconstruction of equilibrium theory with selection theory as its cornerstone. For another, it began from a practical consideration of monetary policy, and devoted itself to the study of economic fluctuations, in short, focusing on the question of employment, eventually it arrived at a tentative framework through the new tool of income analysis.

These two approaches formed the mainstream of the neoclassical school, and Joan Robinson writes of what transpired during this period as follows. 'Latter-day academics have, for the most part, undergone a striking change. The circumstances of the times have forced them to concentrate on two problems, monopoly and unemployment, which naturally raise doubts as to whether all is for the best in the best of all possible economic systems, and they are more inclined to analyse the defects of capitalism than to dwell upon its merits.' [3]

The approach focusing on unemployment, dubbed the 'Keynesian Revolution,' flourished in academia and critical circles, and is also notable for the ripples it caused in the development of theory and actual events from that point on. The approach that addressed the question of monopolies, in comparison, does not seem to have been particularly influential outside the circle of a certain group of economists, and at first glance it seems extremely doubtful that it did much to alter the movements of modern economic policy. It is undeniable, however, that this approach constitutes an undercurrent that cannot be ignored when looking at the development of modern economics.

There are two reasons for this. One is related to the realistic character of economic theory. When it comes to systems of income analysis of the kind represented by John Maynard Keynes, regarding the process of extracting theory, the polishing and selecting of analytical tools, and the theoretical consequences of the system, attention is always paid to their connection to reality, and, needless to say, their orientation toward policy is extremely strong. Moreover, by agreeing with the focus on economic policy after the First World War, the policy significance of such theories was buoyed by the tide of the times. The following words of Joseph Schumpeter are worth noting here. '*The General Theory* presented an analytic apparatus. . . . If we follow his exposition step by step, we observe that this apparatus had been designed in order to give convenient expression to certain facts of 'the world in which we live' . . . , these facts are attributed to his fundamental schedules（propensity to consume, attitude to liquidity, and marginal efficiency of capital）as special characteristics〈obtaining from the circumstances of the world and various psychological trends〉and not as 'logically necessary' properties . . . the special characteristics in question are

3　Joan Robinson, 'Marx and Keynes,' *Collected Economic Papers*, Vol. 1, 1951, p. 133.

the characteristics of England's aging capitalism as seen from the standpoint of an English intellectual. There can be no question of their having been established by antecedent factual research'[4] (emphasis added). The other approach, as it happened, arose more out of a pure theoretical debate over how to resolve an internal contradiction in the dominant theory than from policy considerations. Nor was the validity of its policy implications the main point at issue. Of course, it is not correct to view this approach as though it were merely a conceptual game being played in a vacuum; in the process of argumentation that aimed at a higher level approach to reality an understanding of the fact of large-scale monopolies was naturally assumed, and indeed the gap between the awareness of this fact and the explanatory schema of existing theories lay in the background of this debate.

A comparison of the two approaches based solely on the realistic character of their theories, however, may risk missing their true significance in the history of economic theory. Here I will not address the fact that, when we take up the problem of the 'reality of theory,' unless considerable care is taken various meanings can be mixed into the concept of reality, making its significance quite vague and often leading to intractable confusion. What I would like to point out here is the following. The new development represented by Keynes, to the extent that it was a new turn in economics, was a criticism of the fundamental propositions of previous theories and actively brought arguments to bear against them, while the other approach, too, to the extent that it buried the arrow of its purely logical critique deep in the target of the dominant theories, shaking the foundations of their system, possessed a fundamental incisiveness, and must presumably have had an impact on the validity of the policy consequences of these theories. When we look at the two approaches from this perspective, both can be seen as originating in a fundamental theoretical critique of the Marshall/Pigou system. As a result, when it comes to the theoretical ecdysis in the two approaches of the neoclassical school I noted at the start, if we expand the problem from the initial perspective both approaches can be seen as attempting to establish an active explanatory schema of two phenomena of capitalist systems (monopolies and unemployment) and in the process formulating criticisms of the same theories. If this way of looking at things is correct, then in order to establish the significance of these two approaches in the history of economic theory, we must, as a necessary preliminary condition for this inquiry, examine the significance and limitations of their respective critiques of the dominant theory. Moreover, what makes the work of looking back at the significance of these approaches even more interesting today is that, when they are examined

4 J. A. Schumpeter, *History of Economic Analysis*, New York, 1954, pp. 41–42.

as the starting points from which issues are raised, both, whether explicitly or implicitly, involve the more fundamental issue of the confrontation between the classical and the modern in the field of economics.

II Sraffa's Position in the History of Economic Thought and a Few Related Issues

Piero Sraffa's work on cost and profit, as an undertaking that put forward the approach addressing the problem of monopolies discussed above, clearly possessed epochal significance. In conducting a critique of the dominant theory, he was clearly conscious of a conflict with the British classical school and Ricardo's economic legacy in particular, and, with this as his critique's criterion of judgment, addressed the problem of defining the valid scope of the theory of the equilibrium of supply and demand that constituted the cornerstone of the theories of Marshall and Pigou.

We must note that Sraffa fully assimilated the economics of the Italy of his day, in particular the legacy of the economics produced by the late-period Lausanne school represented by Enrico Barone and Umberto Ricci, and turned his eye toward a critique of the neoclassical school on the basis of having clearly grasped the significance of the problems found within it. As a result, we must say that the significance of Sraffa's work in the history of economic theory does not stop at his critique of the theories of Marshall and Pigou, but also includes an internal critique of the late-period Lausanne school led by Barone, and indeed is to be found in this dual-sided nature.

As is well known, in the early period Lausanne school（Léon Walras, Vilfredo Pareto）the main aim was the establishment of a general equilibrium schema for economic systems as a whole, and this was not an approach that took up the problem of clarifying the 'long-run tendencies of costs for an expanding industry' [5] with a Marshallian analysis. Pareto's detailed analysis of 'when production coefficients are variable'（Pareto, *Cours*, II, 714–17）drove a wedge into later theoretical development, but when it came to their［Lausanne school economists'］systems, in general it cannot be said that supply curve theory or the cost curve theory upon which it was based were as clearly illuminated as they were in the Neoclassical school. One of the problems Barone faced was how to introduce Marshall's legacy into the Lausanne system. To put it another way, this can be described as assimilating into the production functions and cost functions developed by Pareto the problem of the supply curve put

5　J. Viner, 'Cost Curves and Supply Curves,' *Zeitschrift für Nationalökonomie*, Vol. III（1931）, Supplementary Note（1950）, Readings in Price Theory, 1952, p. 227.

forward by Marshall from the perspective of general equilibrium analysis.

Barone went through various twists and turns, but in the final stage of his career represented by his *Principi di Economia Politica* he asserted, on the basis of confusing Marshall's 'particular expenses curve' with the supply curve—Marshall himself scrupulously distinguished them—that in a static state of perfect competition only a cost-increase supply curve was both possible and realistic. Along with harshly criticising Barone (and Ricci) for their assimilation of Marshall in regard to their confusion of distinct expenditure and supply curve, Sraffa also rejected the assertion that the production costs of the marginal firm were the regulator of supply prices as a misuse of Ricardo's theory of rent. Today, when we see Barone continuing to have considerable influence without this being noticed,[6] this criticism of Sraffa's cannot be altogether disregarded.

Having criticised the manner in which Barone took up the ideas of Marshall, what was Sraffa's own stance regarding the theories of Marshall and Pigou? In general, when it came to determining the partial equilibrium of individual goods in the neoclassical school, the law of non-proportional returns or law of variable costs that forms the foundation of the supply curve was seen as potentially consistent with the conditions of free competition. Here Sraffa's criticism was pointed at the fundamental theory of the supply curve that was the 'blind spot of modern discourse on value.' Addressing the same situation (a static system of free competition) as the orthodox school he criticised, and with the same aim of determining long-term normal value, he sought to focus on the purely theoretical question of whether the law of variable costs was compatible with the conditions of partial equilibrium. Here, if I may jump ahead to the conclusion of his criticism, he held that on the basis of the assumed conditions only the 'constant cost thesis' could be affirmed, and showed that the theory of partial equilibrium that constituted a cornerstone of Marshall and Pigou's doctrine was erected on an unreliable foundation that contradicted its own posited assumptions. On the basis of this interpretation Sraffa then went on to argue for the superiority of the British classical school, and in particular the economics of Ricardo, over the neoclassical school as a system of perfect competition.

The effect this criticism of Sraffa's had on the Marshallian analysis as 'a cross between the theory of value and the theory of output as a whole' [7] with its strongly realistic character cannot be ignored. In particular, it is of critical significance regarding Pigou's system that deepened analysis along these lines; as

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6 For example, J. Marchal's *Cours d'économie politique* (Paris, 1952), one of the standard textbooks used in France, clearly presents the implication of Barone's formulation on pages 581–83.

7 J. Robinson, 'Rising Supply Price,' *Economica*, New Series, Vol. VIII (1941), Readings in Price Theory, p. 233.

is well known, in his system the gap between ideal output（giving maximum satisfaction）and actual equilibrium output arises through the condition of variable costs.[8] As a result, if Sraffa's criticism is on the mark then the central pillar of welfare economics that uses fiscal policy as a lever regarding variable cost industries must be vulnerable.

When we consider later developments, however, the problem actively posed to the neoclassical school by Sraffa as a result of his criticism—along with confirming the classical school's 'constant cost' thesis in determining partial equilibrium under the conditions of perfect competition—was how to solve, to borrow Robertson's phrase, 'the puzzle of competition under increasing returns.' That is, as Marshall pointed out, the firm that utilises the returns of internal economies（division of labour）before others should, if these types of economies can continue to be enjoyed indefinitely as the scale of production increases, eventually monopolise the production industry to which it belongs, a fact that will contradict the assumption of competition itself. But in reality instances of increasing returns are often seen, and the hypothesis of competition is difficult to discard. The hypothesis of competition is even more indispensable in responding to demands for a systemisation of economic theory. How is this dilemma to be resolved?

According to Sraffa, one tentative solution to this dilemma was provided by Marshall. His approach involved the introduction of 'external economies' as a compromise between the reality in which circumstances of increasing returns are often observed and the demand for the hypothesis of perfect competition（which contradicted increasing returns）. External economies in a broad sense as they are generally seen cannot satisfy the requirement of partial equilibrium, and the realism of the concept of the kind of external economy that would satisfy this condition（an isolating method）, namely, an economy external to individual firms but internal to an industry, is extremely dubious. As mentioned above, Sraffa, who moved away from Marshall's conception of external economy, upheld the constant cost thesis as normal under the condition of

8　The theory concerning fluctuations in supply prices in Pigou's system of welfare economics has in the past been a topic of dispute, and has been the part of the system that has received the most revision. While A. Young and D. H. Robertson's critiques of Pigou（A. Young, 'Pigou's Wealth and Welfare,' *Quarterly Journal of Economics*, 27（4）, 913; D. H. Robertson, 'Those Empty Boxes,' *Economic Journal*, 34, 1924）can be considered of great significance concerning the process of revision and development of this theory, as I discuss later Sraffa's influence can be said to be even more pivotal. On Pigou's theoretical wanderings in relation to this topic, from his early writings to his final stance, see H. S. Ellis and W. Fellner, 'External Economies and Diseconomies,' *American Economic Review*, 33, 1943, pp. 493–11.

perfect competition, but how did he solve the puzzle of the reality of competition under increasing returns?

On this point, too, as is widely acknowledged, Sraffa must be assigned the position of an advocate, but before getting into this I would like to touch on several possible solutions to the puzzle described above. One of these is a standpoint which, while maintaining the hypothesis of perfect competition, employs the kind of concept of an external economy capable of satisfying the requirement of partial equilibrium pointed out by Sraffa, and (importantly) goes on to reinforce the actual character of this concept in reality—this is more or less Pigou's approach. It is also the approach of Robertson, who plotted a 'partial rehabilitation of Marshallian orthodoxy on conservative lines' through Marshall's concept of a representative firm. Another solution is the approach suggested by Allyn Young of abandoning the partial equilibrium approach, and, while holding that Marshall's external economies in a broad sense are a fundamental fact of increasing returns, reconstructs a dynamic theory of increasing returns premised on a related industrial structure. There is also the perspective of Schumpeter, who rejected the analytic significance of long-term diminishing supply curve itself, but what we must pay most attention to here is the method of solving this puzzle pioneered by Sraffa.[9] This was an attempt to reconstruct a theory of increasing returns (diminishing costs) not through the approach of determining overall output but rather that of determining a partial equilibrium of particular goods. In any case, Sraffa attempted to introduce the imperfectness of the market by abandoning the hypothesis of perfect competition, and to demonstrate the existence of diminishing supply curves through the positive use of monopoly theory. Later development of supply analysis simultaneously featured the emergence of the theory of imperfect competition, but it is not an exaggeration to say that the establishment of the theory of imperfect competition culminating in Pigou and Chamberlin's proofs based on Kahn's principle, if we look at it in terms of its basic principles, signified a more thoroughgoing analytic apparatus based on ideas originally put forward by Sraffa.

By the way, to the extent that the system of equilibrium price theory is seen as one of the characteristics of orthodox modern economics, the significance of the debate ignited by Sraffa is presumably not limited to an internal matter of the Cambridge school. In fact, the 1925 article on costs translated here was painstakingly reviewed by Milan's Gustavo Del Vecchio,[10] and Oskar

9 Cf. D. H. Robertson, P. Sraffa, and G. F. Shove (Symposium), 'Increasing Returns and the Representative Firm,' *Economic Journal*, 40, 1930, pp. 84–89.

10 G. Del Vecchio, 'Il costo quale elemento della teoria economica,' *Giornale degli economisti*, 66, 1926, pp. 167–72.

Morgenstern,[11] active in the mainstream of the Vienna school, attempted a detailed expository development of its theoretical ideas. And while the degree of their interest may have varied, the leading British economists of the 1930s,[12] to the extent that they saw the problem as reconstructing supply analysis in order to solve the puzzle of competition under increasing returns, as we noted, could not place themselves outside the sphere of influence of this debate.

Here it is particularly important to reflect on the perspective of Hicks, who attempted to compile a theory of general equilibrium on the basis of the Marshallian tradition, because having put the firm at the core of his analysis in establishing the actual character of the conditions required for a stable equilibrium in production theory he could not ignore the debate over costs instigated by Sraffa. To the extent that the ideas introduced by Sraffa opened his eyes to the problem of monopolies, the question of whether the conditions required for a stable equilibrium were realistic in the face of the fact that monopolies are seen on a wide scale could not be avoided. If he was to stick to the traditional system of perfect competition, how was he to deal with the factor of monopolies? Given that in the period after the First World War, and indeed even more so today, the factor of monopolies is a consistently and widely observed phenomenon, and that for him discarding the hypothesis of perfect competition amounted to destroying the system as a whole, this was an extremely serious problem.[13]

In this section, I have sketched the line of thought put forward by Sraffa

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11 O. Morgenstern, 'Offene Probleme der Kosten- und Ertragstheorie,' *Zeitschrift für Nationalökonomie*, 2 (4), 1931, pp. 481–522.

12 A comprehensive list of writings concerning cost and price is appended to *Readings in Price Theory*. A list of related texts up to around 1930 is given at the front of the Robertson, Sraffa, and Shrove Symposium publication mentioned above (*Economic Journal*, 40, 1930, p. 79). A more comprehensive, explanatory list of contemporary writings in Britain, France, Germany and Italy is also given in the text of Morgenstern's article cited above (*Zeitschrift für Nationalökonomie*, 2 (4), 1931, pp. 487–89, §5. Das neuere Schrifttum der Kosten- und Ertagstheorie).

13 In addition to having been raised in the soil of the late-period Lausanne school and therefore acquired a thorough knowledge of the significance and limitations of the questions and apparatus it produced, Sraffa was also well versed in the problematic nature of the theories of the neoclassical school, and Hicks, conversely, while having grown up in the midst of the tradition and intellectual atmosphere of the neoclassical school, was also proficient in the modes of thought and analytical equipment of the Lausanne school, so if it were possible to contrast these two economists' views on Marshall and Walras it would surely be fascinating. Putting aside any interest in the history of [economic] thought, however, Hicks presumably could not have been neutral when it came to the problem of the analysis of firm costs raised by Sraffa. See 'The Equilibrium of the Firm' in J. R. Hicks, *Value and Capital*, 1939, pp. 78–88. See also Shigeto Tsuru, op. cit., pp. 14, 75.

(hereafter referred to as the 'Sraffa debate') and briefly summarised some of the issues it raised, so I should perhaps also briefly touch on the Clapham/Pigou debate[14] that led to its development. One significant aspect of this debate was that, while it concerned the realistic nature of the hypotheses of constant, diminishing, and increasing costs,[15] regardless of whether they were affirmed or not, in no case was the logical validity of these hypotheses called into question. In Sraffa, however, the hypotheses of diminishing/increasing costs—to the extent that they involved conditions of partial equilibrium—directly logically contradicted the premise (static perfect competition) on which they were posited. Sraffa found a contradiction in their common foundation, and this assertion was thus more fundamental and more concerned with basic principles than what was discussed in the Clapham/Pigou debate, and in this sense Sraffa can be seen as occupying the true position of instigator in regard to later thought along these lines. In what follows I would like to distinguish several points within Sraffa's body of work, and, by engaging with them, elucidate some of their significance.

III Sraffa's Work and the Development of Firm Analysis

It is well known that Marshall's analysis had the character of a macroscopic view centred on industries. Some may say, 'Don't we on the contrary find the 'representative firm' approach in Marshall?' But even his direct disciple Robertson pointed out that the representative firm is 'a small-scale replica of the supply-curve of the industry as a whole.' [16] Moreover, he also acknowledged that it was constructed in order to 'tackle the puzzle of competition under increasing returns.' [17] As we have already noted, it was Sraffa's view that Marshall's diminishing supply curve revolving around 'external economies' was constructed to solve this difficult problem. Looking just at this point, therefore,

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14 J. H. Clapham, 'Of Empty Economic Boxes,' *Economic Journal*, 32, 1922, pp. 305–14. 'Reply' by A. C. Pigou, ibid., pp. 458–65. 'Rejoinder' by Clapham, ibid., pp. 560–63. See also A. C. Pigou and D. H. Robertson, 'Those Empty Boxes,' *Economic Journal*, 34, 1924. pp. 16–31. We should note that Sraffa departed from this debate in the 'raising of the issue' in his first article.

15 Morgenstern accurately spells out Clapham's thesis that set off this debate. 'The [theoretical] validity and formulation of the law of returns are beyond doubt; however, they are wholly worthless because they do not allow for any practical application. In particular, Pigou's programme for subsidisation and taxation thus comes to naught because it is impossible to say which industries have shown which progression of returns.' (O. Morgenstern, op. cit., S. 490).

16 Robertson, Sraffa, and Shove (Symposium), op. cit., *Economic Journal*, 40, 1930, p. 89.

17 Ibid.

Robertson can be seen as accepting Sraffa's raising of the issue. In any case, as is well known, the construction of Marshall's theory did not take firm analysis as its cornerstone, nor did it shed great light on this topic. From the point of view of people influenced by modern equilibrium theory that possessed a firm-centred microscopic character, this approach to analysis of Marshall's was thought of as the weak point of his theoretical structure. Here it is useful to quote the words of Kaldor: 'Instead of analysing at first the conditions of equilibrium for individual "firms" and then deriving from them, as far as possible, the conditions of equilibrium for an "industry," Marshall first postulated the latter and then created a *Hilfskonstruktion* ［that is, the representative firm—Hishiyama］ which answered its requirements.'[18] This kind of theoretical construction, according to Kaldor, was Marshall's 'real weakness.'

If Marshall can be seen as the figure who determined the direction of the theoretical construction of the neoclassical school, this school, as seen above, can be described in a very general sense as being industry-centred and macroscopic in its perspective. But how did the neoclassical school incorporate this firm analysis, seen by Kaldor as its 'real weakness,' into its system, and how did it augment and organise its theoretical construction? Firm analysis has the analytical presentation of firm activities at its foundation. And to the extent that firm activities are primarily represented through cost functions, the question posed above amounts to asking through what kind of process firm cost analysis was introduced into the neoclassical school. Here we should address this by reflecting on the process of theoretical development in Sraffa's first article on cost, and in particular the significance of its presentation of a parabolic cost curve. In this section I do not have the space to discuss this issue in detail, so I will only attempt a broad overview of its development that cannot be avoided from the perspective of the history of the literature.

I must begin by establishing Sraffa's method of constructing a collective supply curve. When constructing a collective supply curve, if the approach of postulating an industrial equilibrium at the start contains a deficit insofar as it assumes the conclusion it is supposed to derive, what approach should be taken in order to avoid falling into this hole? Since in the context of free competition an industrial equilibrium is the result of a series of firm equilibria formed independently by competing firms, in order to clarify the relationship between an industry and its individual firms we must reconstruct the transition from individual supply curves to a collective supply curve.[19] When it comes to the

18　N. Kaldor, 'The Equilibrium of the Firm,' *Economic Journal*, 44, 1934, p. 62.

19　P. Sraffa, 'Sulle relazioni fra costo e quantità prodotta,' *Annali di Economia*, Vol. II, 1925. p. 300. Cf. N. Kaldor, op. cit., p. 61.

construction of a collective supply curve, then, what sort of shape will firm supply curves and firm cost curves take in the context of a static system of free competition?—This must be our starting point. Sraffa, by criticising the deficit in Marshall's process of constructing a cost curve in this way, presented the question of firm cost curves under conditions of competition as something that should logically come first.

Today, theoretical assertions such as that firm cost curves form a parabolic shape (and moreover that this remains valid under any sort of market conditions), that the ratio of combined production factors determines the shape of the cost curve, and that, particularly in the long term, intangible production factors, such as, for example, entrepreneurs' co-ordination, are of great significance, have become nearly universally accepted and can be seen in a large number of textbooks. This kind of generally accepted theory by no means appeared out of thin air. Looking at Sraffa's contribution in this regard reveals the twists and turns one of the analytical concepts of today's economics underwent in the process of being formed, and regardless of whether or not one agrees with its conclusions, it is necessary to have a good understanding of this process if one is to address at least part of the system of economics at a fundamental level. It goes without saying that, as is well known, this firm cost analysis was of pivotal importance to the neoclassical school when it came to the question of how perfect competition was related to industrial efficiency, the question of whether a system of competition ensured a definitive equilibrium, and fundamental questions of price in general. As Sraffa points out, it was Alfred William Flux who clearly formulated for the first time in analytic terms the fact that graphically the cost function of a firm is parabolic in shape, and that moreover marginal cost must intersect with average cost at its minimum. Sraffa quotes from the second edition of Flux's *Economic Principles* published in 1923, but the same words are found in the original edition of 1904, so precisely speaking this ought to have been the text cited.

Flux succeeded in formally formulating the point of perfect operation seen in everyday experience, and after this—this was something Sraffa overlooked—the influence on costs exerted by the activity or stagnation of the economy has been presented in relation to the analysis of firm costs described above.[20] The significance of what Sraffa pointed out about Flux, in addition to highlighting the inherent deficiencies of the neoclassical school's firm cost analysis, was as a criticism of the fact that even though one of Marshall's early disciples had presented a clear conception regarding this point, later members of the neoclassical school had ignored it. The import of the presentation of firm cost analysis by Sraffa, however, did not stop there, but was also to be found in the active presentation of the legacy of firm cost analysis in contemporary Italy—as will

be discussed later, Barone, for example, succeeded in a formulation of firm cost analysis—in contrast to that of the British neoclassical school, and the use of the words of Flux, one of Marshall's own disciples, to more effectively awaken them to this comparison.

The impact Sraffa had on leading members of the neoclassical school regarding this point deserves special mention. Two conflicting stances were taken in response. One was that of Robertson.[21] In his debate with Sraffa in the pages of the *Economic Journal*, he held fast to Marshall's 'representative firm' approach, and did not accept the parabolic cost curve presented by Sraffa. The other stance was that of Pigou.[22] In his response to Sraffa, without attempting to engage with the 'external economies' criticism of Marshall and himself, Pigou directly accepted Sraffa's criticism regarding firm cost analysis, and then attempted, in line with Sraffa's formulation of the collective supply curve, to further develop this supply curve theory around the axis of the 'equilibrium firm' and thereby defend the Marshallian perspective.[23] As this theory formed the cornerstone of Pigou's production theory, the significance of the influence of

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20 A. W. Flux, *Economic Principles*, London, 1904. p. 62. Flux considered the movement of demand in the context of economic fluctuations, and asserted that during periods of stagnation firms do not achieve their optimal scale, prices do not reach the cost minimum, and (because [prices] are on the decreasing curve of average costs) they are not [the same as] marginal costs. Moreover, since Flux saw stagnation as the normal state of affairs, this was seen as the situation that applied during periods of normal business. It was not as though Flux originally set out to present individual diminishing demand curves under imperfect competition, but his analysis of the effect of contracting demand during periods of economic stagnation on firm costs bore a certain resemblance to the 'equilibrium that occurs under excess capacity' described in imperfect competition theory.

21 Robertson, Sraffa, and Shove, op. cit., *Economic Journal*, 40, 1930, pp. 87–89, 92–93.

22 A. C. Pigou, 'The Laws of Diminishing and Increasing Cost,' *Economic Journal*, 37, 1927, pp. 188–97; 'An Analysis of Supply,' *Economic Journal*, 38, 1928, pp. 238–57. The latter paper, as is widely known, includes the definitive form of Pigou's law of fluctuating cost, which had previously been given a scattered presentation in Part II, Chapter XI (increasing and decreasing supply price) and Appendix III (a diagrammatic and mathematical treatment of certain problems of competition and monopoly) of his *Economics of Welfare*.

23 The style of the further development of Marshallian analysis by Robertson, Pigou, and, as will be discussed later, Robinson differed in the case of each of these economists. Concerning only the Sraffa debate, regarding their presentation of Sraffa's approach—if I may be permitted to express their stances in such terms—Robertson was crudest, Robinson was most flexible, and Pigou was somewhere in between. The task of clarifying their respective models in accordance with their process of theoretical development and grasping the significance of the Marshallian system within the neoclassical school, if it is to be undertaken, may contain more than simply matters of interest in the context of the history of theory.

Sraffa's criticism on Pigou cannot be ignored.

The presentation of parabolic and U-shaped cost curves by Sraffa, as is clear in his first paper on costs（p. 308–309[24]）, is derived from the hypothesis of perfect competition itself; in contrast to this, in his second paper on returns he can be seen as adopting an assumption of diminishing individual cost curves on the basis of the hypothesis of imperfect competition. Furthermore, for the most part only the formal aspects of the parabolic curve were addressed, and—while it was touched on briefly in his debate with Robertson—its verification in reality was not sufficiently clarified.[25] On this point, at least, Sraffa cannot be said to have surpassed the legacy of Italian economists such as Barone. The undertaking of this sort of work arose from within the neoclassical school. Here we must mention the contribution of E. A. G. Robinson's famous 1931 text *The Structure of Competitive Industry*. There are two points in particular I would like to mention regarding his work. One was his having sought a factual basis for the parabolic cost curve in the problem of 'co-ordination' among entrepreneurs.[26] There are those such as Schneider who sought the reason for the cost curve's transition to increasing in the rising prices of production factors, but in the neoclassical school the hypothesis of perfect competition was generally seen as valid when it came to production factors as well, and as a result, despite fluctuations on the scale of individual firms, their prices were by definition invariable, and such explanations were therefore avoided.[27] The other point I would like to address is that this type of cost curve was generally seen as valid regardless of market conditions—that is, regardless of whether or not the market is perfect. This is an important point when it comes to understanding the transition in thought from Sraffa's presentation of the theory of imperfect competition to what is known as 'Kahn's principle' through the work of J. Robinson. Diminishing individual demand curves formed the common basis of these theorists' imperfect competition equilibria, but when it came to premises concerning costs, in Sraffa, as noted above, there was a hypothesis of diminishing individual costs, while in Kahn's principle, on the other hand, as is widely known, a parabolic or U-shaped cost curve was posited. As in Sraffa, a parabolic cost curve was derived from the hypothesis of perfect competition itself（and it was therefore not

24 P. Sraffa, 'Sulle relazioni fra costo e quantità prodotta,' *Annali di Economia*, Vol. II, 1925.

25 According to Sraffa, a firm equilibrium is achieved when the reciprocal forces are equal, but when it comes to these forces he goes no further than stating they are the 'disadvantages of increasing size, disadvantages of expansion' in opposition to 'internal economies,' and does not address any further the factual basis for the formation of a firm equilibrium. Cf. *Economic Journal*, 40, 1930, pp. 90, 93.

26 E. A. G. Robinson, *The Structure of Competitive Industry*, 1931, pp. 35. 44–48.

27 Cf. H. Aoyama, *Dokusen no Keizairiron*（*Economic Theory of Monopolies*）, 1937, p. 314

logically necessary that it should apply in the case of imperfect competition as well）; this may be considered quite obvious. But getting from Sraffa's assertion to the change in Kahn's principle in the premise concerning costs can be thought of as having required the realistic verification of the general validity of the U-shaped cost curve（under which, regardless of market conditions, in general the transition to increasing costs is rooted in the difficulty of co-ordination）by E. A. G. Robinson.

Kaldor attempted a rejection of the determinativeness of the firm cost function under static conditions, an assertion that, if true, would be extremely damaging to the neoclassical school; even if the ultimate grounds that determine the long-term cost curve are seen in 'co-ordination,' since this possesses an essentially dynamic nature the firm cost function that gives a firm's optimal scale cannot—to the extent that a static hypothesis is adopted—be derived from it.[28] I cannot discuss the fascinating debate between Kaldor and E. A. G. Robinson[29] here, but as is widely known, following this process a tentative resolution of this matter was reached in Hicks' *Value and Capital*.[30] For Hicks, too, the key to determining production equilibria was the formation of a parabolic cost curve in firm equilibria. In any case, in modern economic theory, to the extent we are thinking about systems of microscopic/price analysis, the parabolic or U-shaped firm cost curve, whether in the case of a partial or general equilibrium, has in this way broadly been placed within the toolkit of British economists and thereby become woven into their theories. Sraffa's intermediate, issue-raising role in the process of the development of these ideas is of pivotal importance. Regarding the significance of this intermediary role of Sraffa's, while we must pay attention to his having raised issues for the neoclassical school concerning the importance of firm analysis and methods of approaching it, in terms of the history of economic thought it is also important to take note of the fact that, as has already been suggested—even if in that case he cited Flux—Sraffa also brought the results of contemporary Italian cost analysis, which he revised along with elements of Marshall's work, back into the neoclassical school. I would like to conclude this section by identifying some of his pioneering contributions that cannot be ignored regarding this point.

I must begin by discussing Pareto. In the section on 'La production' included in the second volume of his 1897 *Cours d'économie politique*, Pareto shows that a firm（average）cost curve should take a parabolic shape, and goes on to

28　N. Kaldor, op. cit., *Economic Journal*, 44, 1934, pp. 70–72.

29　E. A. G. Robinson, 'The Problem of Management and the Size of Firms,' *Economic Journal*, 44, pp. 242–57.

30　Cf. J. R. Hicks, *Value and Capital*, 1939, pp. 78–88, 199–200.

seek grounds for this claim in the difficulty of firm 'government' (*gouvernement*). His ultimately seeking realistic grounds for the U-shape in the 'difficulty of government' (*difficultés du gouvernement*) was a precursor to E. A. G. Robinson's previously mentioned problem of 'co-ordination.' He writes:

> If the unit cost of a good constantly decreased as the quantity produced increased, it would be advantageous for the production of all goods to be concentrated in a single firm. This is admitted by some authors, who believe that monopolies must therefore arise. However these authors have not given sufficient consideration to the difficulties of *the government* of large firms. These difficulties are such that, in general, each firm has a certain limit beyond which the cost of a unit of production increases rather than decreases. Except in very rare cases, there were hardly any monopolies created under a regime of free competition. Almost all existing monopolies have their origins in direct or indirect law.[31]

Putting aside whether or not Pareto's claim about the actual formation of monopolies at the end of this passage is correct, he clearly showed that firm average costs form a U-shape. From here it is a single step to formulating how the marginal cost intersects with it at the average cost minimum. This step was taken by Barone. Beginning with Pareto's assertion that monopolies will presumably arise if the unit cost of a good decreases without limit (which had in fact originally been put forward by Marshall[32]), he writes as follows.

> In general this is not seen in reality. Experience shows that when a firm expands beyond a certain point the cost of producing a unit does not decrease, but instead begins to increase as shown in Figure 10, both because of the particular difficulties of expanding productive organisation beyond a certain scale and because of being unable to achieve an advantageous combination as a result of the difficulty of procuring certain production factors in the necessary quantities.[33]

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31 V. Pareto, *Cours d'économie politique*, Tome II, 1897, pp. 89–90.

32 A. Marshall, *Principles of Economics*, (1890), 8th ed., p. 459, note 1.

33 E. Barone, *Principi di Economia Politica*, Roma, 7ª Ristampa, 1929, p. 10. The main pages of relevance in the version in my possession, the 1912 printing, are 17 and 18. Barone's *Principi*, was first published in 1908 as a summary of his lectures (cf. Prefazione alla 7ª Ristampa), and the page numbers have differed in each subsequent edition. Sraffa refers to the 1913 edition, but I have not been able to obtain a copy.

The ‘Figure 10’ referred to here diagrams the firm cost function using the collective cost curve and the sales（revenue）curve. In analytical terms it means that at cost minima average cost is equal to marginal cost, and at profit maxima marginal cost is equal to marginal revenue. It also shows that under free competition cost minima coincide with profit maxima.[34] In other words, under this hypothesis the sales curve becomes the tangent of cost minima, and price becomes equal to average cost and marginal cost. In this way Barone clearly formulated the firm parabolic cost curve. It has now become clear that Sraffa’s cost analysis stands upon the legacy of Barone. The parabolic cost curve even seems to have been the common understanding among Italian experts at the time. If we look at the debate between Sraffa and Robertson once again from this perspective, in a sense it can perhaps be seen as a debate between the late-period Italian Lausanne school and the British neoclassical school. This is the case because Sraffa, if we consider only his analysis of firm costs, did not surpass Barone. His departures from Barone’s approach are to be found in the structure of the collective supply curve under static perfect competition and establishing the superiority of the thesis of constant returns while rejecting Barone’s diminishing returns thesis. In a broad sense this distinction can also be seen as manifesting in their different interpretations of Ricardo, but this is a point I would like to discuss elsewhere.

In a very broad sense, viewed in this light the role played by Sraffa in the history of the analysis of cost after Marshall can be stated as follows. As I have already noted, the first raising of the issues of supply curve theory or cost curve theory in a general sense in modern economics can indeed be sought in Marshall. As discussed above, scholars of the late-period Lausanne school such as Barone saw incorporating these questions into the system of general equilibrium as one of their tasks. The analysis of *firm* costs that had been ignored in the neoclassical school’s analysis was thereby deepened, and this was then brought into the neoclassical school, giving rise to a need to reconstruct Marshall’s collective supply curve on this basis. If this view of events can indeed be accepted, then Sraffa—when it came to this one, particular issue—was indeed an intermediary facilitating the flow of ideas between these two schools of thought, and can be regarded as the person who situated this issue and established the direction in which its solution was to be found. This somewhat dull, dry concept can be seen in the more eye-catching peaks of Pigou and Hicks and found in a wide variety of texts that have been written over the years, but even as a single concept it has been hotly debated in a steady stream of disputes and interchanges

34　E. Barone, op. cit., p. 13.

concerning the legacy of the studies of many scholars.[35] Amidst this extensive legacy, however, the first formulation of the idea, or clarification of the location of the problem it signified and introduction of it as an issue to be addressed—to the extent that this idea or problem was a cornerstone indispensable to a completed system—was surely an important achievement that cannot be ignored.

IV The Reconstruction of Supply Curve Theory in the Neoclassical School and Sraffa's Position

Tackling 'the puzzle of competition under increasing returns' [36] was an important problem posed by Sraffa. How this puzzle was to be solved can be said to have determined the direction of the debate over supply curve theory from that point onward. Even looking only within the neoclassical school, the approaches to dealing with it from various perspectives were not necessarily uniform. How it tackled this problem was, so to speak, a touchstone by which each system was to be judged. It can perhaps also be said that without addressing this sort of question it would be impossible to fully grasp the significance of the development of the theory of monopolies within modern price theory in the period following the First World War. I will therefore discuss this problem in slightly more concrete terms by focusing on Sraffa, the economist who first posed it.

That increasing individual returns through internal economies were not consistent with competitive price theory was a point on which Marshall, Pareto and Barone were all in agreement. This was because if a given firm could reduce costs while increasing production indefinitely, this would result in the firm in question obtaining a monopoly over the entire supply of the good in question, and this of course contradicted the hypothesis of competition. I have already mentioned that here the Lausanne school lineage of Pareto and Barone, in order to avoid falling into this contradiction, formulated a parabolic cost curve with a

35 When speaking of the Lausanne school and the Cambridge school, it is easy to picture two individual groups perfecting their own hardened shells in parallel. From the perspective of theoretical development, however, it seems that this was not in fact the case. In reality the situation may have been closer to pictures of liquids separated by fixed intellectual traditions with half-opened windows that allowed for currents of differing characters to interact with each other, resulting in individual streams developing in a spiral while shedding their skins. This was also the case to a greater extent than one might imagine when it came to the process of development of classical economics. Unlike that of fine art, however, the process of development of economics has the added difficulty of having to interact with realistic problems posed in the course of actual history, and indeed can be considered inseparable from them. Cf. G. Tarde, *Essais et mélanges sociologiques*, Paris, 1895, pp. 309–89（Monadologie et Sociologie）.

36 Op. cit., *Economic Journal*, 40, 1930, p. 89.

firm cost function that was compatible with competition. This is what Sraffa used to illustrate the form of the costs of the representative firm in his first paper. In addition, by reconstructing the collective supply curve with this as his cornerstone he hammered out the 'constant cost thesis,' thereby distinguishing himself from Barone, who had put forward the 'increasing cost thesis.' Without the perfect competition postulated in theory, however, in reality the phenomenon of diminishing individual costs is often observed. Under this realistic understanding, diminishing costs do not harmonise with the competition theory that contradicts them（pp. 306–07[37]）. How was this contradiction between *reality* and the *theory* of competition to be resolved? This was the question that Sraffa, going beyond Pareto and Barone, raised, and it is was this point that formed the foundation of his criticism of Marshall and Pigou.

When Marshall's analysis is viewed from this perspective, his theory of 'external economies' is seen as a hypothetical structure involving a compromise between the theory of competition's necessity and reality. Even if formally it is conceivable that the particular 'external economies' of a certain industry may create a structure with a diminishing collective supply curve, the factual basis for this is dubious, and fundamentally it is not realistic. Sraffa's criticism of Marshallian 'external economies' can be seen as two-sided. External economies in a broad sense that arise out of Marshall's so-called 'general progress of industry' are taken to be incompatible with the premise upon which the supply curve itself stands, and in theory their inclusion in the supply curve structure is seen as impossible, while the other kind of external economy of a particular industry（namely, economies of large-scale production that are external from the perspective of a particular firm but internal from the perspective of an industry）, although formally it conforms to the isolating method that is a necessary condition of partial equilibrium, is rejected as something that is implausible in reality.

Looking at how Pigou responded to this criticism of Sraffa's is not only necessary in order to grasp the process of the theoretical ecdysis of the neoclassical school, but also carries great significance in light of the fact that it is 'generally agreed,' as Robbins[38] puts it, that increasing returns under competitive conditions can be explained through external economies. In his response,[39] as has already been mentioned, Pigou accepted Sraffa's presentation

37　P. Sraffa, 'Sulle relazioni fra costo e quantità prodotta,' *Annali di Economia*, Vol. II, 1925.

38　L. Robbins, 'Remarks upon Certain Aspects of the Theory of Costs,' *Economic Journal*, 44, 1934, p. 12.

39　A. C. Pigou, 'The Laws of Diminishing and Increasing Cost,' *Economic Journal*, 37, 1927, pp. 188–97.

of a parabolic firm cost curve. From what has already been stated, it can be said that he incorporated the legacy of Italian cost analysis into the foundation of the neoclassical school's supply curve theory. In addition, he also tried to defend the idea of diminishing supply curves caused by 'external economies' that had been in place since Marshall under conditions of competition. Since Sraffa's criticism of particular 'external economies' of an industry, as we have seen, was made mainly on empirical grounds, Pigou's response, too, should presumably have been to demonstrate the realistic nature of these 'external economies.' In fact, his paper on supply analysis[40] published the following year, considered purely in terms of its formal aspects, was merely a higher level development of the structure of a collective supply curve when 'external economies' exist that had been presented by Sraffa. The question was therefore not whether 'external economies' may be formally utilised in the structure of the collective supply curve, but whether they might actually exist. Let us now attempt to take a closer look at how Pigou ultimately came to think about this issue. This will presumably amount to his response to Sraffa.

According to Pigou, 'conditions of decreasing supply price from the standpoint of the community are clearly possible in a material as well as in a formal sense.' In other words, when the transfer factors (between a firm and the owners of production factors) that emerge from the fluctuation in the price of production factors that accompanies an increase in output in a certain industry are eliminated[41]—this is his 'standpoint of the community'—external economies particular to that industry are both *formally* and *realistically* possible. Here, as mentioned above, it is the realistic or practical basis that is at issue. To provide an empirical foundation for his formal reasoning he cites the reduction of production costs through 'the increased specialisation of its component firms made

40 A. C. Pigou, 'An Analysis of Supply,' *Economic Journal*, 38, 1928, pp. 238–57.

41 This kind of community viewpoint and industry viewpoint distinguished while considering transfer factors in this way can be more clearly expressed mathematically. In the case in which an industry is assumed to have particular external economies (the case considered by Pigou), as Sraffa states (see P. Sraffa, op. cit., p. 307, the production costs of each firm do not merely depend on that firm's own output, but also on the output of the industry as a whole to which it belongs. Studying partial equilibrium in the case in which external economies are assumed thus requires the consideration of three variables: (K), the production costs of the firm, (x), the output of the firm, and (y), the output of the industry as a whole. The production costs of the firm, K, can therefore be expressed as $f(x, y)$.

Now let us consider various quantities of the production factors directly and indirectly required to produce output x as a, b and c, and their prices as p_1, p_2, and p_3.

The *supply price* (as it is equal to the firm's average costs in equilibrium) is

(to be continued)

possible by an enlargement in an industry as a whole' described by Sydney Chapman in his study of the spinning industry in Britain. He then, regarding this type of external economy, arrives at the following conclusion. 'The essential point is that an increase in the scale to which an industry is producing frequently alters—in general diminishes—the average （and marginal） costs of the equilibrium firm contained in it, whether or not it also alters its size. There is, then, no difficulty in seeing that the law of decreasing supply price from the standpoint of the community is not merely formally possible, but is likely to be followed in practice by many manufacturing industries.' [42] Pigou thus sought diminishing costs under perfect competition in the 'specialisation of firms.'

$$\frac{ap_1 + bp_2 + cp_3}{x} \quad \cdots\cdots(1)$$

Increasing, constant, and diminishing costs from the perspective of the industry are then nothing other than particular states of the rate of change that exists between the supply price and the industry's output as a whole. If we follow Pigou's presentation, this rate of change （the rate of change of supply price） is

$$\left(\frac{d}{dy}\right)\left\{\frac{ap_1 + bp_2 + cp_3}{x}\right\} = \left\{p_1\frac{d}{dy}\left(\frac{a}{x}\right) + p_2\frac{d}{dy}\left(\frac{b}{x}\right) + p_3\frac{d}{dy}\left(\frac{c}{x}\right)\right\} + \left\{\frac{a}{x}\cdot\frac{dp_1}{dy} + \frac{b}{x}\cdot\frac{dp_2}{dy} + \frac{c}{x}\cdot\frac{dp_3}{dy}\right\} \quad \cdots\cdots(2)$$

The first term on the right-hand side of equation （2） signifies the amount of the increase in production costs the firm must bear when aggregate output y increases slightly owing to the fact that it must buy more supply factors *at the same price as before* for each unit of output. As is widely known, a/x, b/x, . . . correspond to Walras' coefficients. The right-hand component therefore represents the changes in individual production prices when an increase in the output of the industry as a whole causes changes in the production coefficients of the firms that compose it, and it should be noted that this type of change in production costs comes only from changes in the firm's technical elements under the assumption that the prices of production factors are constant. The second term on the right-hand side of the equation, in contrast, signifies the amount of increased expenditure per unit of production that arises when a firm purchases production factors in the case where aggregate output y increases slightly. The increase in production costs represented by this term arises out of the change in the price of production factors that accompanies an increase in the output of the industry as a whole, and do not arise out of technical elements. As it happens, this type of firm's increased expenditure corresponds to the amount transferred from the firm in question to owners of production factors, and from the perspective of the community as a whole is offset by converse increased expenditure by the owners of production factors. The rate of change of supply price from the perspective of *the community as a whole* must therefore be sought in the elimination of the transfer factor （the right-hand term） from equation （2） （cf. A. C. Pigou, *The Economics of Welfare*, 4th ed., pp. 217–18, 791–805）.

42 A. C. Pigou, op. cit., *Economic Journal*, 38, 1928, p. 252; *The Economics of Welfare*, 4th ed., pp. 219–20.

The significance of distinguishing between the standpoint of the community guided by the fluctuations in the price of production factors that accompany an increase in output by a given industry and the standpoint of the industry in Pigou's system can be said to lie in a delicate compromise between reality, in which, regarding fluctuations in revenue (costs), there is a reciprocal interaction between the individual industries that make up the economy as a whole on the basis of closely intertwined relationships, and the demands of the (post-Marshallian) partial equilibrium theory that is industry-centred and requires the isolation of designated industries from within these relationships. Nevertheless, by postulating that the supply of all production factors used by the industry in question are perfectly elastic, we can presumably seek the simplest situation and tentatively isolate the effects of increasing returns and diminishing costs. In this case, can Pigou's 'specialisation of firms'—which can be described as 'lateral disintegration' in the jargon of economics—explain the existence of diminishing costs under perfect competition? J. Robinson replied to this question in the negative. According to her, when the scale of the industry in question expands, costs will at first diminish through the pursuit of specialisation among individual firms. But even if, for example, the market grew enough to accommodate several firms specialising in the same count [type of yarn], the limits of specialisation would be reached, and eventually costs would cease to decline. To the extent that perfect competition is assumed, therefore, the optimal degree of firm specialisation would presumably be immediately determined, and this type of diminishing costs, in an industry made up of only one firm, would only continue until the optimal scale is reached.[43] We can then ask the following question. Even in the case when, as posited above, the supply of production factors to a given industry is perfectly elastic, is it possible to completely isolate the effects of increasing returns? When this industry expands, the scale of other industries that provide the means of production to it will grow in turn, and in some cases this will then cause the price of the goods of these other industries to decline. To the extent that the correlation seen here is direct, the static system whose assumption is required in order to isolate the designated industry and extract the supply price of its product will be disturbed. To the extent that we postulate static perfect competition, here it would seem that the decline of supply price cannot be established on a theoretical basis. Looked at in this light, the Marshall/Pigou theory of 'external economies' may seem to collapse in the face of the criticisms of Sraffa and Robinson. In particular, to the extent that Pigou's important welfare policy propositions stand on the basis of this theory,

43 J. Robinson, *The Economics of Imperfect Competition*, London, 1933, pp. 338–39.

criticism of this cornerstone can presumably be described as more internal and decisive than the other criticism[44] concerning the measurability of utility.

The theory of increasing returns based on ‘external economies’ had thus come a cropper. If so, how was the problem of increasing returns under circumstances of competition to be solved? The so-called ‘theory of imperfect competition’ was one answer that was put forward. And it was none other than Sraffa himself who gave this answer its conception and developed it as a schema. This being the case, the characteristics of this approach can be seen in his having pursued this question on the basis of an assumption of static conditions and partial equilibria. In the development of the issue, however, there is an awareness of reality that is divorced from the hypothesis of perfect competition.— If reality contains monopolistic elements on a wide scale, then to what extent is it possible to carve it up at will with both traditional competition theory and monopoly theory? An understanding that in the real world the power of competition was overwhelming and monopolies were at most nothing more than friction or a muddling factor that impeded the manifestation of this trend was implied within the traditional perfect competition system.[45] But weren’t monopolies, on the contrary, not simply frictional or temporary factors but rather normal forces with respect to the system that themselves gave rise to some accumulative effects? This kind of understanding of reality can be seen as having existed in Sraffa’s positing of a theory of imperfect competition. As Robertson says,[46] while he intends to make active use of the theory of monopolies, this approach is underpinned by the understanding that real markets are monopolies or imperfect markets. And imperfect markets are illustrated by falling individual demand curves. This was therefore the starting point of the debate over imperfect competition. In an imperfect market, the uniformity of the market is destroyed. The market is divided into partial markets corresponding to each firm. And the firms in question then enjoy monopolistic positions within the scope of these markets. If an assumption is made on the cost side, then it becomes possible to apply the traditional theory of pure monopolies that indicates marginal cost and marginal income should be equal. As Sraffa points out, the

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44 This was, of course, the criticism of welfare economics centred on Lionel Robbins. See the explanatory notes on the Japanese translation of Pigou’s *Welfare Economics*（p. 47 seq.）

45 See, for example, the above-mentioned works of Pareto and Barone. In Hicks, however, perfect competition was ‘an immensely simplifying approximation of the facts’（J. R. Hicks, op. cit., p. 85, note 1）. Developments in the reality that had to be explained can be seen as underlying this shift in the nuance of the meaning attached to this apparatus.

46 Cf. Robertson, Sraffa, and Shove, op. cit., *Economic Journal*, 40, p. 84.

origins of the idea of this kind of imperfect market are to be found in Marshall. What divides Sraffa and Marshall, however, is that the former saw this as the hypothesis closest to reality. Of course, the monopolistic position of a firm in an imperfect market is constrained by price competition from other firms and other industries with which it has a substitution relationship. In this way a firm's monopoly power over a partial market depends on the price policy of its competitors. The imperfect market proposed by Sraffa therefore has a half monopolistic, half competitive character.

What sort of significance does the postulating of this kind of imperfect market have when it comes to the task of determining diminishing supply prices? Under imperfect competition, a firm's equilibrium output is less than the optimal scale, and since individual (average) costs decline this alone increases the potential for declining supply prices.[47] But while imperfect competition can resolve the equilibrium of a firm through the application of monopoly theory, to the extent that individual firms stand in a relationship of competition with each other it is necessary to also consider this aspect of competition in order to pursue the equilibrium of the industry as a whole. To construct a theory of price determination under imperfect competition in accordance with Sraffa's proposal —this is where the aim of later systemisations of imperfect competition theory was to be found.

The construction of the theory of imperfect competition from that point forward was conducted using the 'industrial equilibrium' schema[48] developed through a presentation of 'Kahn's principle' by J. Robinson, who had taken up Sraffa's conception, and the argument put forward by Pigou and Chamberlin in which they elucidated the mechanism of the determination of the number of firms.[49] The process of the development of this theory and the criticism of the

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47 J. Robinson, 'Imperfect Competition and the Falling Supply Price,' *Economic Journal*, 42, 1932, p. 544. See also, however, her analysis regarding the question of whether or not falling average firm costs will necessarily lead to falling supply prices (cf. ibid., p. 549 seq.) The work of R. F. Harrod concerning the reconstruction of the supply curve and the falling supply curve should also be consulted regarding this point.
R. F. Harrod, 'Notes on Supply,' *Economic Journal*, 40, 1930, pp. 232–41. 'The Law of Decreasing Costs,' *Economic Journal*, 1931, pp. 566–76. 'An Addendum,' ibid., 1932, pp. 490–92, 'A Further Note,' ibid., 1933, pp. 337–41 (J. Robinson, 'Reply,' ibid., pp. 531–32, R. F. Kahn, 'A Note,' ibid., 1932, pp. 657–61).

48 J. Robinson, 'Imperfect Competition and Falling Supply Price,' ibid., pp. 544–54. See in particular pp. 545–49. See also H. Aoyama, ibid., pp. 327–35.

49 A. C. Pigou, 'A Note on Imperfect Competition,' *Economic Journal*, 43, 1933, pp. 108–12. E. H. Chamberlin, *The Theory of Monopolistic Competition*, 1933, pp. 81–94. Cf. H. Aoyama, ibid., pp. 336–48.

theory of imperfect competition have already been discussed in detail in this country,[50] so there is no need for me to address them here. I would like to make two points before moving on. First, it must be acknowledged that the position of the proponent who first presented such a conception and approach to imperfect competition and also its rough theoretical framework must be given to Sraffa, and that he was moreover not merely the one who proposed the theory of imperfect competition but also—and this was of great importance in the process of the development of this theory—the one who raised the question that it was intended to answer in the first place（this was not a question that was only connected to the theory of imperfect competition）. The second point is related to what kind of significance the theory of imperfect competition possesses in the history of economic theory as a whole. Let us look at this a bit more closely.

The essence of the theory of imperfect competition can be seen in Kahn's principle, but its most important conclusion lies in the 'equilibrium of excess capacity.' With imperfect competition, a firm's equilibrium output does not reach its optimal scale. As a result, its equilibrium prices, too, are higher than in the case of perfect competition. In the case of imperfect competition its optimal efficiency cannot be guaranteed, and resources are also wasted. Along with being, as is widely known, a conclusion of the theory of production found in Walras and Pareto, the proposition that perfect competition guarantees that the given set of resources are used as economically as possible and provides the highest level of efficiency and satisfaction was also demonstrated by them directly.[51] It is also widely known that Marshall and Wicksell[52] undertook a critique that limited the validity of this proposition. Sraffa's criticism of the 'external economies' found in Marshallian analyses, as has already been mentioned, indirectly shows that the revisions to this proposition made by Marshall and Pigou cannot be support-

50 It goes without saying that the theoretical foundation of the discourse on imperfect competition lay in Kahn's principle in regard to the problem of industrial equilibrium. As long as its assumptions are permitted, Kahn's principle is, logically speaking, perfectly correct. Criticism of imperfect competition theory was thus leveled against the realistic character of assumptions upon which it was based（the veracity of these assumptions regarding the actual phenomenon of monopolies）. In this case, when it comes to what is taken as signifying the reality of the theory, there is a single criterion possessed by the various criticisms. Here I will go no further than recommending two studies, Hideo Aoyama's previously mentioned *Dokusen no Keizairiron*（*Economic Theory of Monopolies*）, 1937, and Seijirō Kishimoto's *Kakaku no Riron*（*Theory of Price*）, 1940.

51 L. Walras, *Eléments d'économie politique pure*, éd. définitive, 1926, pp. 231 seq., V. Pareto, *Cours*, II, pp. 90–94.

52 A. Marshall, *Principles*, pp. 462–76. K. Wicksell, *Lectures on Political Economy*, London, 1934, Vol. I, pp. 72–83.

ed theoretically. Here Sraffa's construction of the collective supply curve on the basis of an analysis of U-shaped firm cost curves, to the extent that the 'constant cost thesis' in perfect competition is taken to be normal, can be seen as amounting to the reconfirmation of the old proposition from a new perspective. Nevertheless, the 'equilibrium under excess capacity' [53] found in the imperfect competition theory that was intended to serve as a substitute for traditional competition theory, by seeking its cause in the imperfection of competition and therefore in monopolies, is capable of possessing greater critical significance in terms of pointing out the flaws in modern monopolistic economic systems than a higher level approximation (Sraffa).[54] If we consider the policy consequences of the theory in this way it is clear that it is a double-edged sword, but when it comes to the theory's significance in the history of economic thought, this is presumably to be sought instead in the extent to which it can elucidate the monopolistic structures that make up one aspect of modern capitalism.

V The Modern Transformation of the Law of Diminishing Returns and the Backdrop to Sraffa's Formulation

The origins of the law of diminishing returns go back a long way; it is no exaggeration to say that they are found at almost the same time as the emergence of recent times economics. This law was born a long time ago, and its lifespan has also been long. Its form and function have not always been the same, but one way or another it has managed to survive until the present day. When we look back at the history of economics, there are developments that, while receiving numerous attacks, and sometimes as a result also becoming a source of new developments, have over time—whether explicitly or implicitly—become the premises or underlying assumptions of this field. The quantity theory of money and the law of markets are two such developments. The law of diminishing returns is another. During its germination period it seems to have had a connection to the propositions of continental population theory and mercantilism, but it was through British economics during the Napoleonic wars that it was first taken up as an important question in economics. According to Edwin Cannan, 'The early nineteenth century English economists obtained the law of

53 N. A. Kaldor, 'Market Imperfection and Excess Capacity,' *Economica*, II, 1935, pp. 33–50.

54 The special dynamic monopoly theory recently put forward by Schumpeter and Galbraith goes as far as to present the heterodox idea of monopoly efficiency rather than monopoly waste. See the following article that attempted to reconsider this theory. J. L. Vauzanges, 'L'économie《practicable》,' *Revue economique*, No. 6, 1955.

diminishing returns, like most of their doctrines, not from study of the works of their predecessors, but from the actual experience of England during the war.' [55] As Sraffa and others, including Cannan, have pointed out, the first formulation of the law of diminishing returns in a clearly explicit manner was conducted by Turgot. It has also been noted that an accumulation of experience in agriculture and its regular development lay hidden behind Turgot's formulation, and the intermediary position of the physiocrat Baudeau as a pioneer of his approach must not be ignored. I cannot go into these matters here, but there is one point worth noting before I move on. Because Turgot's formulation—as is clear from Sraffa's graphical representation—showed the point of maximum returns and the initial segment of increasing returns, and because this was moreover given a rigorous expression, there is a tendency to evaluate it more highly than the schema of the classical school from the perspective of the use of a modern law of returns as the foundation of a theory of price.[56] It was perhaps because of this way of thinking that when Sraffa conducted his critique of the formulation of the law of returns by Edgeworth and Bullock he began with a consideration of Turgot. In any case, what sort of problems did the law of diminishing returns address in the classical school? Here it seems there are two points that should be considered. The first is that the law of diminishing returns, which was seen as manifesting exclusively in land, was taken to be closely connected to the so-called 'theory of differential rent.' This can be described as a generally accepted theory, and has been linked with names active around 1815 （Edward West, Thomas Robert Malthus, Robert Torrens and David Ricardo[57]）. We can point to the writings[58] of Karl Diehl as representative of this kind of scholarship, and

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55 E. Cannan, 'The Origin of the Law of Diminishing Returns, 1813–15,' *Economic Journal*, 1892, p. 55. ditto, *A History of the Theories of Production and Distribution in English Political Economy* （hereafter *Theories*）, 3rd ed., 1922, p. 148. In the following account I have relied greatly on Cannan's text cited above regarding the period before J. S. Mill, and, particularly in regard to the process of the revision of the law of diminishing returns after Mill, on the magnum opus of Professor Byé cited below. Here I am engaged in nothing more than the passive task of slightly reorganising the content of the list of texts cited in the appendices to Cannan and Byé's books with Sraffa's theory of diminishing returns as the focal point in order to clarify the background surrounding it and facilitate further research.

M. Byé, *Les Lois des Rendements non proportionnels, leur évolution et leurs formes modernes*, Paris, 1928 （hereafter *Lois des Rendements*）.

56 Cf. Charles Gide et Charles Rist, *Histoire des doctrines économiques depuis: les Physiocrates jusqu'à nos jours*, p. 171 note 1. 'Let us note how Turgot's perspicacious mind has observed a fact which, in classical expositions, generally goes unnoticed: at the beginning of cultivation, there is an optimum period during which the yield is *more than proportional*.'

Sraffa, too, regarding only this point, can be seen as adopting the perspective of this generally accepted theory. The second point is that the law of diminishing returns can be thought of as closely connected to Malthus' 'law of population.' Diminishing returns in agriculture and population pressure are seen as premises in the theory of capital accumulation that addresses Ricardo's change in distribution effect through the law of wages. Hector Denis[59] was the first to present Ricardo as having undertaken dynamic economics on the basis of this perspective, and can be seen as a forerunner of today's interpretation[60] of Ricardo by Roy Harrod and others. In his magnum opus, Byé, who undertook a detailed study of the history of the law of returns, distinguishes these two points, lets the former belong to static and the latter to dynamic economies, and sees them as the static and dynamic aspects of the law of returns in the classical school. To address the position of the law of returns within the system of the classical school lies beyond the scope of this essay, but there are two points I would like to make here in preparation for later discussion.

The first concerns Sraffa's way of thinking. In his articles cited in this paper, guided by the aim of justifying Ricardo's theory of the diminishing returns of land in the context of the Marshallian assumption of a long-term static state and defending it from the criticisms of Marshall and Wicksteed, Sraffa dealt with the classical law of diminishing returns strictly in relation to the theory of rent. Nevertheless, he himself, in a note written as the editor of *The Works and Correspondence of David Ricardo* as part of his effort to address the significance of Ricardo's theory from the perspective of his entire system, emphasised, from the perspective of the process of the formation of the theory in particular, that the law of diminishing returns first emerged as the 'profit principle' and

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57 T. R. Malthus, *Observations on the Effects of the Corn Laws, and of a Rise or Fall in the Price of Corn on the Agriculture and General Wealth of the Country*, 1814, ditto, *The Grounds of an Opinion on the Policy of restricting the Importation of Foreign Corn*, 1815, ditto, *An Inquiry in the Nature and Progress of Rent, and the Principles by which it is regulated*, 1815; David Ricardo, *An Essay on the Influence of a Low Price of Corn on the Profits of Stock, etc*., Sraffa's *Works*, Vol. IV; R. Torrens, *An Essay on the External Corn Trade, etc*., 1815; E. West, *An Essay on the Application of Capital to Land, etc*., 1815.

58 Cf. K. Diehl, *Sozialwissenschaftliche Erläuterungen zu David Ricardo's Grundgesetzen der Volkswirtschaft und Besteuerung*, (1905) 3. Auflage, 1921, SS. 403 sq.

59 See H. Denis, *Histoire des Systèmes économiques et socialistes*, 1902, Vol. II, pp. 113–204. Regarding the presentation of Ricardo's system as a dynamic economics, however, one must also cite Patten and Toynbee. S. N. Patten, 'The Interpretation of Ricardo,' *Quarterly Journal of Economics*, 7 (3), 1893. A. Toynbee, *Lectures on the Industrial Revolution*, 1920.

60 R. H. Harrod, *Towards a Dynamic Economics*, 1948.

pointed out similarities with West. And by understanding the law of diminishing returns as the theory of rent, Sraffa also rejected the view of the Clark school that regarded 'Ricardo as the originator of the whole marginal theory.' [61] As is widely known, Ricardo's law of profit, as a conflict between wages and profits, was a markedly dynamic/developmental theory. How was this kind of stipulation of the theory of diminishing returns as the *principle* of profits related to the approach based on a static theory of returns in relation to the theory of rent?—This kind of question was not only an unresolved issue in Sraffa's interpretation of Ricardo, but was also left unaddressed when he considered the theoretical significance of the classical school's Ricardian system. The second point concerns Cannan's criticism of the generally accepted view that population theory was closely connected to the theory of diminishing returns. Its direct bearing was on the interpretation of Malthus' theory of population, but to the extent that population theory in some form was one of the premises of the system of the classical school it is a discussion that cannot be ignored. According to Cannan, the connection between the law of population and the law of returns mentioned above is not seen in Malthus himself, and the approach that posits this connection is ultimately one that brings the Malthusian perspective seen in Mill—in which the two laws are connected—into Malthus.[62] When it comes to the law of diminishing returns itself, too, he asserts that Mill directly addresses its contradiction by empirical fact and revises it from its original status as a law providing a schema that explains reality in the system of the classical school into a law as a *trend*.[63] Since the work of organising and synthesising the system of the classical school in Mill was presumably triggered by pressures from new intellectual developments and facts encountered in reality, revision based on an awareness of the problematic nature of these facts is indeed understandable. The formulation of the law of returns and the law of population in Mill, however, along with meaning the systemisation of each, implied a process of transformation and the destruction of their old forms. Here, in order to come to grips with the modern turn in the law of returns, it is therefore necessary to give a rough outline of the kinds of criticisms made of the classical school's law of diminishing returns.

Various arguments against the classical law of diminishing returns of land have been made from different standpoints, but they can be broadly divided into the following three categories. One is an attack directed toward the law of dynamic diminishing returns from what can be termed a historical perspective.

61　Cf. Note on 'Essay on Profits' in *Works of Ricardo*, Vol. IV.

62　Cf. Cannan, *Theories*, p. 144.

63　Cf. Cannan, *Theories*, pp. 175 seq., M. Byé, *Lois des Rendements*, p. 81.

The thrust of this critique is that advances in technology, the division of labour, and progress in the accumulation of capital have allowed returns to increase without pause, and will presumably continue to do so in the future. Critics who belong to this category include, among others, Richard Jones, Thomas Banfield, Paul Leroy-Baulieu, and Yves Guyot.[64] Socialists who assert the same effect occurs because of progress in capitalist societies also belong in this category. Pierre Proudhon, Pierre Leroux, Karl Rodbertus, and Franz Oppenheimer[65] are such figures. The second category includes arguments made against the law of static diminishing returns in agriculture from what can be described as a naturalistic standpoint. The gist of this critique is that since the productive capacity of nature is unlimited, the abundance of land can be increased greatly and without limit through cultivation and rational cycles. Robert Owen, Charles Fourier, and, in particular, Pierre Leroux, Henry Carey, Erasmus Peshine Smith, Henry George,[66] belong to this category. The third and final category includes criticisms levelled against the law of static diminishing returns within economics in a narrow sense. These critiques assert that since the concept of abundance is essentially relative, by changing the system of cultivation intensive production can be carried out on any sort of land. Thomas Chalmers, Carey, Wilhelm Roscher, Hippolyte Passy, and Banfield[67] belong to this category.

Jones and Chalmers' critique of the law of diminishing returns was presented very early on, during the 1830s. From a historical perspective, therefore, the critical trends briefly outlined above can be seen as having arisen during nearly the same period in which the system of the classical school itself was

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64 Their works are as follows. R. Jones, *An Essay on the Distribution of Wealth and on the Sources of Taxation*, London: Murray, 1831, F. T. G. Banfield, *Organization de l'industrie,* Guillaumin, 1851, Leroy-Baulieu, *Essai sur la répartition des richesses,* Guillaumin, 1883. Y. Gyot, *La Science économique*, Reinwald, 1887.

65 Proudhon, *Système des contradictions économiques in Oeuvres complètes*, Paris Rivière, 1923. P. Leroux, *Malthus et les Economistes ou Y aura-t-il toujours des pauvres?* Leroux-Boussac, 1849 (éd. Bibliothèque Nationale, 1897). Rodbertus, *Das Kapital*, 1863. F. Oppenheimer, *Theorie der reinen und politischen Ökonomie*, 1910, (*L'Economie pure et l'Economie politique*, trans. Française, Giard, 1914).

66 R. Owen, *Report to Country of Lanark*, 1820, First Letter, July 25, 1817, *Life of Owen*, II, p. 75. Fourier, *L'harmonie universelle et le phalanstère*, Paris, 1849. t. II. H. C. Carey, *Principles of Political Economy*, Philadelphia, 1837–40, E. P. Smith, *Manuel d'Economie politique*, trans. Française, Guillaumin, 1894. H. George, *Progress and Poverty*, New York, 1880.

67 T. Chalmers, *On Political Economy in Connexion with the Moral State and Moral Prospects of Society*, Glasgow, 1832, New York, 1832, Wilhelm Roscher, *System der Volkswirtschaft*, 1854 (*Principes d'Economie politique*, 2 vols., Guillaumin, 1857), H. Passy, 'De la rents de la terre,' *Journal des èconomiste*, 1853, I.

being established by Ricardo. These lines of criticism presumably emerged because of discrepancies between the facts the classical school's system was trying to explain and the explanatory schema it offered, but merely presenting the classical school with new facts its system couldn't explain would not solve the problem; it was necessary to come up with a new theory that could explain them. All of these critiques contained the seeds of new assertions and approaches to systemisation, but can they ultimately be said to have presented new systems to replace that of the classical school? In any case, here I will go no further than examining a few points that will serve as premises when looking at how Sraffa handled the law of returns. The first is to ask how the law of diminishing returns of land was revised in modern theory, or, in other words, to establish the new form this law has acquired.

The clearest and most logical criticism of the agricultural form of the law of diminishing returns of land was given by Simon Patten and Ghino Valenti.[68] In terms of their lineage they are perhaps closest to Chalmers and Jones. The theory of Valenti, an Italian, is particularly worthy of attention. Drawing on Justus von Leibig's law of the minimum, he argued that, as long as there is an assumption of rational choice on the part of farmers and a fixed amount of knowledge of agricultural technology, until a 'saturation point'—a point beyond which production does not increase—is reached, returns will be proportional to investment; in other words, the law of proportional returns will be in effect. But when we assume instead the dynamic condition of the application of new scientific discoveries or new agricultural technologies, the limit of the point of saturation will constantly be pushed back. As a result, the general trend toward investment in agriculture will mean increasing rather than decreasing returns, and since the absolute saturation limit is very far off we find ourselves in a state of long term increasing returns. As is widely known, the law of diminishing returns constantly operates in the classical school, and this usage is not seen as being undermined by mechanisms of increasing returns accompanying improvements in agricultural technology or management, which are viewed as merely temporary. This kind of critique of the classical proposition made by Valenti, however, was a rare exception, and at least under static conditions the law of diminishing returns flows straight through the middle of modern economics. That being said, we must not forget that important changes were introduced. I will now go over the gist of them.

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68 S. W. Patten, *Premises of Political Economy*, G. Valenti, 'Le base agronomiche della teoria della rendita,' *Giornale degli Economisti*, 1895, pp. 233–68, 329–66; ibid., 1896, pp. 1, 238; ditto, 'Teoria delle proporzioni definite,' ibid., 1905, pp. 507–24; ditto, *Principi di Scienza Economica*, Firenze, 1909.

First, to begin with, the dynamic and historical form of the law of diminishing returns was abandoned. This was done because, as has already been noted, the classical school's proposition was clearly contradicted by empirical facts underpinned by rapid progress in chemistry and mechanics and the development of marine transport and the international division of labour. It has already been discussed how, in the face of this difficulty, from Ricardo to Mill the law of diminishing returns was transformed from a schematic explanation of reality to simply the expression of a trend or tendency. But while in Mill this trend was seen as possessing the force of *necessity*, in economists such as Marshall, Thomas Carver, and Henry Sidgwick it is often seen as being *potential*.[69] Schumpeter was more thorough; along with seeing the law of diminishing returns as admissible only under static conditions, he claimed that under dynamic conditions it was on the contrary increasing returns that would commonly obtain.[70] That being said, in its early period the members of the neoclassical school generally held that ultimately the law of diminishing returns was not something that could be ignored even from a dynamic perspective, although in such cases they focused on the existence of a conflict between two opposing forces. According to Marshall, increasing returns are a human matter, and diminishing returns are on the contrary a manifestation of the opposition of natural forces. The material civilisation of humanity has developed through a conflict between these opposing forces. In Sidgwick it is the power of the human intellect that ultimately triumphs in this struggle, and it is the law of increasing returns that holds sway in practice. Dealing with changes in returns, however, presumably also requires the resolution of their relationship to capital accumulation. Walras, Eugen Böhm-Bawerk, Adolphe Landry, Carver, and Edwin Seligman[71] can be cited in this regard, but I will not address this topic here.

The second, modern change added to the law of diminishing returns was the incorporation of alternative cultivation systems from the perspective of individual farmers into its static conditions. Originally, when the law of diminishing

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69 A. Marshall, *Principles*, Ch. XIII. Sidgwick, *The Principles of Political Economy*, London: Macmillan, 1901, Ch. VI. T. N. Carver, *Distribution of Wealth*, New York, 1908.

70 J. Schumpeter, 'Das Rentenprinzip in der Verteilungslehre,' *Jahrbuch für Gesetzgebung*, 1907, II.

71 Böhm-Bawerk, 'The positive Theory of Capital and its Critics,' *Quarterly Journal of Economics*, 9 (2), 1895, pp. 113–31, 10 (2), 1896, pp. 121 seq., ditto, *Kapital und Kapitalzins*, 2 vols., 1884, 89, T. N. Carver, 'Diminishing Returns and Value,' *Scientia*, 1909, pp. 331 seq. A. Landry, *Manuel d'Economique*, Paris: Giard, 1908, ditto, 'On the Returns of Productive Agents and on the Productivity of Capital in Particular,' *Quarterly Journal of Economics*, 32, 1909, pp. 557 seq. Edwin R. A. Seligman, *Principles of Economics*, New York, 1908. L. Walras, *Elément d'Ecomonie politique pure*, 4 éd., 1900.

returns was dealt with on the basis of static conditions it was premised on a fixed cultivation system and management method. By seeking the foundation of this law not in increasing intensiveness within a fixed amount of land but rather in the choice of cultivation systems on the part of individual farmers, however, this law was completely stripped of its veil of naturalism. To delve into these changes and understand them requires an examination of the work of Frank Taussig, John Commons, and Etienne Antonelli,[72] but it is already clear that Sraffa followed this line when it came to the reconstruction of the universal law of diminishing returns. The critique of Marshall and Francis Edgeworth he carried out can be understood as possessing this kind of significance.

The third point that must be noted regarding the changes added to the law of diminishing returns involved considering not only diminishing returns from land in regard to capital and labour invested in cultivation, but also changes in returns of capital and labour in regard to a fixed piece of land. This kind of shift in perspective can be described as a natural result of seeing the decisions made by agricultural entrepreneurs as playing an important role in regard to the law of decreasing returns. In practice, farmers were thought of as being able to substitute a certain amount of land for a certain amount of capital or labour. On this point Carver's work[73] is important, and the construction of the law of returns by Sraffa was also conducted on the basis of this way of thinking.

The following point can be raised as a fourth issue that should be considered regarding the modern way of thinking about the law of diminishing returns. It concerns the fact that, as was already mentioned, to the extent that fluctuations in returns are introduced by changes in the cultivation system chosen, it may well be impossible to construct a simultaneous, continuous curve of diminishing returns. Putting aside the previously mentioned Valenti, most economists acknowledged that there are many maxima of returns, and that the locus that connects these points should be incrementally declining. This new formation of a Ricardian law of diminishing returns through the postulating of many maxima of returns was one reason they ignored Carey's criticism of Ricardo.

Many have acknowledged the fact that in a theory of diminishing returns thus conceived there are areas of increasing returns on the way to the maxima of returns recognised by Turgot. Here we can point to older figures such as Nassau William Senior and Mill, and Marshall, Carver and Edgeworth[74] among the modern economists. But since in general these areas of increased returns

72 F. Antonelli, 'Note sur la loi du rendement non proportionnel,' *Revue d'economie politique*, 1911, pp. 145, 345, J. R. Commons, *The Distribution of Wealth*, London: Macmillan, 1893, F. Taussing, 'Capital, Interest and Diminishing Returns,' *Quarterly Journal of Economics*, 22 (3), 1908, pp. 333 seq.

73 Carver, op. cit., *The Distribution of Wealth.*

were not seen as normal, they tended to be ignored. There were two methods by which this phenomenon was disregarded. The first was the approach taken by Marshall, in which it was held that the inferior land of the sort in which increasing returns emerge at first are not normally cultivated, and these areas of increasing returns were thus abstracted. The other was the approach taken by Sraffa, which boiled down to a way of thinking in which an initial stage of increasing returns was technologically possible but economically difficult to accept. In this way it was claimed that until farmers had actually cultivated all of the land they would only cultivate the area of land necessary to implement the optimal combination of production factors, so until this point was reached a state of constant returns would prevail. We must pay attention to the fact that in addition to positing the kind of rational farmers and perfect knowledge hypothesised by Valenti, Sraffa's approach was also based on an assumption of unlimited divisibility of production factors. While increasing returns may at first occur if the area of cultivated land has reached a minimum beyond which further division is impossible from the perspective of individual farmers, they can be ignored when dealing with large scale cultivation from the perspective of the economy as a whole.

We have already looked at the main modern changes added to the classical law of diminishing returns, but it is also necessary to take sufficient note of the fact that Sraffa's theory of diminishing returns was based on these general premises. When considering the way in which Sraffa approached this issue, above all Valenti's rational and logical mode of thought and the approach of bringing cultivation systems and the variability of methods of production that arise under the rational choices of entrepreneurs into static conditions taken by economists such as Antonelli remain as elements that cannot be ignored. One significance of Sraffa's theory of diminishing returns lay in its attempt to justify Ricardo's classical law of diminishing returns while relying on this kind of modern mode of thinking, but Sraffa also went a step further and tried to create a general theory of diminishing returns that would be universally valid for all industries as preparation for the formation of a collective supply curve. As is widely known, the law of diminishing returns was generalised under the form of the law of proportionality of factors (the theory of proportionality), and carried through into the foundations of price theory and in particular modern distribution theory (marginal productivity theory). It is therefore necessary for us not only to examine the modern form of the theory of diminishing returns of land but also to offer some broad speculation concerning its process of general ex-

74 Edgeworth, 'Contribution to the Theory of Railway Rates,' *Economic Journal*, 21, 1911, pp. 346, 551; 22, 1912, pp. 198 seq.; 23, 1913, pp. 206 seq.

pansion.

As has already been noted, hidden in the background of the changes to the law of diminishing returns that took place during the modern era there was an estrangement between the explanatory schema found in the classical school and the reality of the facts on the ground, and it cannot be denied that new developments in facts and thought can also be seen underlying the expansion of this law beyond the domain of agriculture as a universal law applicable to all industries. One of these was the industrialisation of agriculture. With capitalism's sweeping takeover of the sector, the places where agriculture was carried out acquired the same character as production factories. Secondly, in accordance with this process land became fluid, and the formerly privileged position of land ownership gradually weakened. From the perspective of agricultural entrepreneurs, land thus became, as Marshall had said, nothing more than one form of capital. Thirdly, along with the privileged position of land ownership breaking down, on the other hand, as Commons found in his analysis,[75] new economic privileges emerged in domains other than agriculture. In any case, the old distinction between agriculture and manufacturing gradually began to weaken in practice, and circumstances in which both agriculture and manufacturing could be dealt with in the same dimension began to emerge. At the same time, this process can also be described as one that weakened the factual basis for the two-dimensional approach of the theory of variable returns that had been established on the distinction between agriculture and manufacturing. New developments in thought were also factors that accelerated this process. As Sraffa pointed out, in terms of both supply and cost the development of utility value theory made possible the establishment of the diminishing returns curve, which was similar to diminishing utility. Regarding this kind of parallel theory concerning utility and cost, we should presumably cite John Bates Clark, Patten, and Seligman.[76] Finally, the use of the mathematical approach in the Lausanne school can be seen as having encouraged the development of the process described above. The various types of production factors were reduced to homogenous proportions on the basis of the form of the production coefficient by these scholars. The optimal production coefficient in the case of Walras and Pareto's variable production coefficient is nothing other than that which realises the most advantageous combination （proportion） of each production factor. Today the work of establishing the generalisation of this kind of law of diminishing returns of land

75 Commons, op. cit.（*The Distribution of Wealth*）, ditto, *Legal Foundations of Capitalism*, 1924.

76 J. B. Clark, *Essentials of Economic Theory*, 1907, Patten, *Theory of Dynamic Economics*, 1892, Seligman, op. cit.（*Principles*）.

is connected to those considered the founders of the theory of marginal productivity. In other words, here we must cite, among others, John A. Hobson, Joseph A. Schumpeter, Adolphe Landry, Léon Walras, Vilfredo Pareto, Enrico Barone, John Bates Clark, Joseph Nicholson, Edwin Seligman, Philip Wicksteed, Albert Aftalion, Henri Truchy, and Paul Reboud.[77]

Nevertheless, the law of non-proportional returns that became the foundation of modern price theory, along with on the one hand being a generalisation of the law of diminishing returns of land, on the other hand also signified the synthesis of theories of diminishing and increasing returns that had been developed separately (the fleshing out of the theory of proportionality). It is necessary to be aware of the following points in order to adequately understand the criticism Sraffa, citing Turgot, made of the law of non-proportional returns. First, we must trace the development of the theory of increasing returns just as we sketched out the development of the theory of diminishing returns. Looking at the modern development of the theory of increasing returns that had classically been characterised as a theory of the division of labour, the position of Marshall is indeed pivotal. And the criticism of Marshall and raising of issues by Sraffa is also of pivotal significance to the development of the theory that followed. I have already touched on these later issues in the previous section, but some supplementation is no doubt required concerning the line of thought leading up to Marshall. Second, it is necessary to trace the process by which the law of diminishing returns and the law of increasing returns were combined under a single principle through the so-called law of non-proportional returns. To do so is nothing other than to examine the thoroughness of the 'theory of proportionality' (the universal application of the concept of rent). The work of Carver, Landry, Frank Fetter, Valenti, Charles Bullock, and Edgeworth[78] is important when looking at this issue. Third, Sraffa's criticism of this generally accepted theory was based on the perception of heterogeneity between diminishing returns caused by changes in the *proportion* of factors and increasing

77 A. Aftalion, 'Les trois notions de la productivité et les revenus,' *Revue d'Economie politique*, 1911, pp. 145, 345, Barone, *Principi di Economia politica*, Roma, 1913, J. B. Clark, *The Distribution of Wealth*, New York, 1899, Hobson, 'The Law of Three Rents,' *Quarterly Journal of Economics*, 1891, pp. 263 seq., Landry, op. cit., J. Nicholson, *Principles of Political Economy*, London 1924, V. Pareto, op. cit. (*Cours*), Truchy, *Cours d'Economie politique*, 2 vols. Paris: Sirey, 1921–23, Schumpeter, op. cit. (*Rentenprinzip*), Reboud, *Précis d'Economie politique*, 2 vols., 1927. Walras, op. cit. (*Elément*).

78 C. J. Bullock, 'The Variation of Productive Forces,' *Quarterly Journal of Economics*, 1902, pp. 500 seq., F. A. Fetter, *Economic Principles*, New York, 1915. I have already listed works by the other authors mentioned and will not repeat them here.

returns caused by changes in the *total amount* of factors, and in order to adequately understand this we must refer to the pioneering work of Landry, Reboud, and Herbert Davenport.[79]

Adopting this view, we must undertake a great deal of painstaking preparatory research in order to properly establish the significance of Sraffa's work in the context of academic history. This is the case because when we attempt to look at things within the flow of history, even in the evaluation of a single epoch-making achievement the intellectual heritage leading up to it and the broader background surrounding it cannot be ignored. This is particularly true in the case of Sraffa, given that he focused on the law of returns, which had a long tradition and enduring vitality, and that this law formed an important cornerstone in modern economic systems—just as the theory of value had in the systems of the classical school. The law of non-proportional returns, a modern form of the law of returns, while on the one hand forming the foundation of a modern theory of distribution as a 'theory of proportionality' of production factors, on the other hand also served as the cornerstone of the modern theory of value as the law of variable cost. In this way theories of static value and distribution were hammered out on the basis of the law of returns within the system of the neoclassical school. It was toward this law that had been placed at the foundation of the neoclassical school's theory of value, however, that the brunt of Sraffa's criticism was directed. If, as Sraffa's criticisms concluded, the supremacy of the 'thesis of constant returns' under static perfect competition had been confirmed, where exactly did that leave the law of variable returns? In another section, I have discussed the issues surrounding the reconstruction of the theory of increasing returns in the partial equilibrium analysis approach of the neoclassical school. But what about the theory of diminishing returns? The definitive solution to this problem within the Marshallian tradition can be thought of as having been given in the Robinson's essay[80] included in *Economica*. Having gone through the debate engendered by Sraffa, this solution—while having been constructed atop the Marshallian tradition—could not help but introduce a certain degree of change to Marshallian partial equilibrium analysis. This was the case because Sraffa had shown that the theory of diminishing returns could not satisfy the conditions of partial equilibrium. In any case, it can presumably be said that in contrast to one resolution of the theory of increasing returns

79 H. Davenport, 'Proportion of Factors: Advantage and Size,' *Quarterly Journal of Economics*, 23 (4), 1909, pp. 593 seq., Landry, *Manuel d'Economique*, 1908, Reboud, *Précis d'Economie politique*, 1927.

80 J. Robinson, 'Rising Supply Price,' *Economica*, 8, 1941, pp. 1–8. *Readings in Price Theory*, pp. 233–41.

(the theory of falling supply price) from the perspective of the theory of price within the neoclassical school being the theory of imperfect competition, a resolution of the theory of diminishing returns (the theory of rising supply price) from the same perspective can be seen in the work of J. Robinson cited above. Establishing the significance of this last point in the history of economics is a task that remains to be addressed.[81]

VI The Supremacy of the 'Constant Cost Thesis' and the Significance of Sraffa's Study of Ricardo

The neoclassical school made the law of non-proportional returns the cornerstone of its system; that is, this law formed the cornerstone of a theory of value and price as the law of variable cost. Distribution theory is presumably subsumed by price theory, but on the other hand modern distribution theory, as the thesis of marginal productivity that acquired broad support, has the law of returns at its foundation. In this way, the modern theories of value and distribution, while both relying on the law of non-proportional returns, are presented as an essentially static system. And since there are many cases in which the classical school is reflected upon from this perspective, it is easy for an interpretation of Ricardo that has been squeezed into this modern Procrustean bed to arise.

J. B. Clark—to speak in terms of the ideas he tried to articulate—saw the systems of value and distribution in the classical school as essentially static. Since originally there had been no conscious distinction between statics and dynamics in the classical school, while its members were 'led to make incursions into dynamic territory' when coming up with formulas for rent in particular, the Ricardian formula is one that 'gives a correct measure of rent in a static state.' [82] It goes without saying that Ricardo's economics were presented as a system of both value and, in particular, distribution theories. As in modern economics the foundation of value theory for the most part shifted from production cost to util-

81 The recent debate surrounding so-called the 'theory of proportionality' in the production function has made explicit the assumptions upon which this theory is based and can also be thought of as being related to the realistic character possessed by these assumptions, but I cannot address this here. Relevant texts are as follows. E. H. Chamberlin, 'Proportionality, Divisibility, and Economies of Scale,' *Quarterly Journal of Economics*, 62 (2), 1948. (*The Theory of Monopolistic Competition*, 6th ed., App. B), 'Comments' by A. N. McLeod, and F. H. Hahn, 'Reply' by E. H. Chamberlin, ibid., 1949, T. M. Whitin, and M. H. Peston, 'Random Variations, Risk and Returns to Scale,' ibid., 1954, H. Leibenstein, 'The Proportionality Controversy and the Theory of Production,' ibid., 1955.

82 Cf. J. B. Clark, *The Distribution of Wealth*, New York, 1899, pp. 371–72.

ity, from this perspective Ricardo naturally came to be seen, as Stanley Jevons put it excessively, as having shunted the car of economic science on to a wrong line, and was seldom rated very highly.[83] In the field of distribution theory, however, in connection with the fact that as we have already seen the widely accepted marginal productivity thesis could ultimately trace its lineage back to the law of diminishing returns from land, Ricardo's law of rent was highly regarded as having given a classical formulation of the marginal theory of distribution. In the past the interpretation of Ricardo in modern economics can be seen as having both implicitly and explicitly adopted this kind of perspective. Moreover, since modern distribution theory was presented as an essentially static system, there was a strong attraction to this perspective, and, since what was being reflected on was Ricardo's theory that made distribution theory the key issue to be addressed in economics, it can be said that in general there was a tendency to look for the significance of Ricardo's theory in an essentially static system. If so, then in the end Clark's interpretation of Ricardo noted above is merely one example of this large-scale trend.

The starting point of Sraffa's interpretation of Ricardo does not belong to this lineage; he was led toward the question of establishing the significance of the classical within modern economics in the field of value and price theory from a reconsideration of the law of variable returns（cost）that lay at the foundation of the neoclassical school. This kind of understanding of the issues, however, also set him apart from the evaluation of Ricardo from a purely subjective perspective undertaken by thinkers such as Jevons and Wicksteed, and also from the attempts—in contrast to this approach—to reconsider Ricardo as the creator of the marginal theory seen in Alfred Amonn, Edward Gonner,[84] and others.

Sraffa's coming to reconsider the law of diminishing returns that possessed a classical origin was thus not for the sake of a close consideration of the marginal productivity thesis that lay at the foundation of modern distribution theory, but rather in order to examine the foundations of the overall supply curve that formed one of the structural elements of neoclassical price theory. This perspective of Sraffa's had already been implicitly manifested in his critique of Wicksteed［pp. 293–94］[85] but can be more clearly perceived in his critique

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83 Regarding the general atmosphere surrounding Ricardian economics both in Britain and on the continent around the time of the marginal revolution, see W. J. Ashley, 'The Rehabilitation of Ricardo,' *Economic Journal*, 1, 1891, pp. 474–75.

84 A. Amonn, *Ricardo als Begründer der theoretischen Nationalökonomie*, 1924, SS. 71–74, Gonner's Introductory Essay to 'Ricardo's Principles,' 1925, xxxiii.

85 P. Sraffa, 'Sulle relazioni fra costo e quantità prodotta,' *Annali di Economia*, Vol. II, 1925.

of Barone's construction of the overall supply curve [particularly p. 298 seq.].[86] As I have already stated, Sraffa rejected Barone's construction of the aggregate supply curve (in which increasing costs based on static conditions of perfect competition are assumed to be normal), and on the basis of posited conditions formulated the normality of 'the constant cost thesis.' In this case—as I have already suggested—we must keep our eye on the differences between these two interpretations of Ricardo.

For Barone, Ricardo's law of rent had to form a central pillar of the theoretical structure when it came to both the theory of the determination of individual prices and the theory of distribution. This was the case because he 'wanted to extend it [Ricardo's theory of diminishing returns] to the supply curve of a product under a regime of free competition' [87] (Sraffa), and because the characteristic phenomenon of rent that emerged out of this theory could be thought of as 'not properly, exclusively of the land, but of *all* [*forms of*] *capital that cannot be reproduced in any desired quantity*.' [88] If we boil down Barone's way of thinking regarding Ricardian economics—thinking about what he was trying to say—this is what we get. Along with the law of rent that stands upon the law of diminishing returns being the fundamental principle of Ricardo's system, modern price theory and distribution theory were also constructed by purifying or expanding it. Looking back at Sraffa's perspective seen at the publication of the collected writings of Ricardo, it seems that for him this way of thinking of Barone's could not by any means be accepted; he asserted that Clark's interpretation, which saw Ricardo as the founder of all marginal theories, was mistaken, and affirmed the view of Patten who saw the theory of rent not as the cornerstone of Ricardo's system but as a 'better proof' of a theory it had already produced.[89] Incidentally, one doubts that, with the exception of Biaujeaud,[90] leading modern Ricardo scholars such as Ammon, Gonner, Diehl, and Briefs[91]

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86 P. Sraffa, ibid.

87 See Sraffa, ibid., p. 298.

88 E. Barone, *Principi di economia politica*, 7ª Ristampa, Athenaem, Roma, 1929, p. 11.

89 Cf. Editor's Note on the 'Essay on Profits,' *Works of Ricardo*, Vol. IV, p. 6, note 3, p. 8, note 1.

90 H. Biaujeaud, *Essai sur la théorie ricardienne de la valeur*, Paris: Sirey, 1934. Biaujeaud's book and Patten's essay (S. N. Patten, 'Interpretation of Ricardo,' *Quarterly Journal of Economics*, 7, 1893, pp. 322–52) are important when thinking about the interpretation of Ricardo by Sraffa discussed later. Incidentally, in his own note at the start of his book Biaujeaud expresses his gratitude to Sraffa for his instruction and assistance.

91 G. Briefs, *Untersuchungen zur klassischen Nationalökonomie*, 1915. Regarding Briefs' opinions that are relevant here, see also p. 360 in Seijirō Kishimoto's *Keizaigaku Genri* (*Principles of Economics*).

had an easy time accepting this perspective of Sraffa's. Nevertheless, they represented the commonly held view regarding the interpretation of Ricardo from the perspective of modern economics, and were given a theoretical grounding by those relying on the marginal productivity theory seen in Clark and Barone as noted above and the economists of the Austrian school. As a result, Sraffa's interpretation of Ricardo can be described as having a distinctive or outlying character in the context of this mainstream view.

Here I would like to conclude by identifying several relevant issues while referring to the way of thinking that is revealed in the *Works and Correspondence of David Ricardo*, which Sraffa edited, and focusing exclusively on his interpretation of classical economics and Ricardo in particular to clarify its characteristics and limitations. Sraffa's distinctive way of thinking about classical economics and Ricardo can be expressed as follows: the core of his economic system lay not in the theory of diminishing returns but rather in the thesis of constant returns. That is to say that in the standard view the main emphasis was placed on Ricardo's law of rent and theory of diminishing returns from the perspective of the cornerstone upon which modern distribution theory was established, but Sraffa, in contrast to this approach, placed his emphasis on the priority of the constant returns（cost）thesis from the perspective of examining the cornerstone of modern（neoclassical）value theory. Regarding this latter point, it should be noted that it includes his opposition to the approach taken by Barone and others, as noted above, in which the law of diminishing returns and the law of rent are formally expanded and brought in as cornerstones in the theory of price. Putting aside for the moment the question of to what extent the constant cost thesis under conditions of perfect competition asserted by Sraffa was valid in line with the classical system, the influence of this proposition of Sraffa's as an alternative approach was presumably too strong to ignore; as I have already noted, along with forming the basis of his criticism of the neoclassical school, this proposition was also the starting point of the raising of a question that was pivotal in the development of the modern theory of price following the First World War.

There is, however, a certain limitation that can be seen in Sraffa's interpretation of Ricardo. By this I mean a limitation stemming from the perspective he takes when dealing with Ricardo. As is clear in his first essay on cost, his consideration of the law of returns（cost）is connected to the cornerstone of Marshallian demand–supply equilibrium theory, and his perspective of criticising this kind of theory was demanded by a partial equilibrium analysis under static conditions of perfect competition. As a result, his interpretation of Ricardo was also undertaken from this perspective of Marshallian analysis. Seen in this light, Sraffa's view of Ricardo can in a sense be deemed representative of the way of

thinking of the neoclassical school. If we look back at the process of theoretical ecdysis of the neoclassical school triggered by the debate over Sraffa's assertions that followed, the approach that placed its emphasis on the interpretation of the classical school may indeed have been demanded not by Marshall but by Sraffa himself.

Nevertheless, Sraffa's interpretation of Ricardo that was limited by this kind of perspective was a reconstructed Ricardian theory based on the approach of the neoclassical school—even if we limit our discussion to its treatment of relative price theory—and therefore differed from Ricardo's own approach regarding these issues. Let us examine this point a bit more closely. The partial equilibrium analysis found in Marshall was suitable for dealing with the question of how the supply of individual goods changes in response to a *net* increase in demand. In this case it was assumed that the economic system outside of the good in question remains constant. In other words, it was assumed that the demand for all other goods would not decline even if the demand for the good in question increases. Therefore, when dealing with the static equilibrium of individual goods, just as in the Lausanne and Austrian school models the total amount of production factors is not fixed, and, putting aside land, the production factors needed for the good in question will be brought into the system in accordance with the increase in demand. As a result, Marshall's treatment of relative price can be said to have been based on an approach that considers how the price of a specific product changes if demand for it changes.[92] This fundamental stance can also be seen in the analysis of J. Robinson, which can be considered a major effort to put forward a definitive price theory from the perspective of the neoclassical school. While adopting the static premise of the Lausanne school, she posits Walras' well known transfer of demand from 'goods that are not A' to 'good A.'[93] In this case, the increase in supply corresponding to the transfer of demand to the good in question, as it is premised on the movement of production factors (including land) from other goods, does not assume a change in the overall amount of production factors as in a Marshallian analysis, but primarily treats the overall amount of production factors as a given as in

92 Cf. J. Robinson, 'Rising Supply Price,' *Economica*, 1941, *Readings in Price Theory*, pp. 233–34.

93 Robinson begins by assuming, as a first stage, a given amount of factors of production without considering its variability, as is the case in Marshall's long-term stasis (Cf. J. Robinson, op. cit., p. 236). The 'transfer of demand' model she postulates could already be seen in Lesson 21 'Résolution des équations de la production' of Walras' theory of production (cf. L. Walras, *Élements*, p. 219. For more on Robinson's critique of Hicks concerning the conclusions of the Lausanne school under this model, see p. 235 in the article mentioned above.

Walras' equilibrium of production. According to Robinson, the fundamental question of value theory is 'the problem of how supply reacts to a transfer of demand.' In Robinson, therefore, while the focus is not on the *net* increase in demand for individual goods but rather on the *transfer* of demand to them, what is seen is the pursuit of a Marshallian approach to the theory of value rather than an addressing of the effects of changes in demand on changes in relative price.

While relying on these assumptions, by bringing differences in the compositional ratio of production factors in each industry into her system J. Robinson draws markedly closer to the classical structure of Ricardo's 'theory of modification of value.' Nevertheless, the difference between their two approaches is clear. This is so even if the treatment of Ricardo's theory of value is limited only to the dimension of changes in relative price, not to the causes of price. In this case, Ricardo, while taking the differences in the capital composition ratio between different industries—according to the classical system the difference in capital composition between agriculture and manufacturing was important—as a given, describes the most important question in value theory as follows. 'How will their relative value be affected by a rise in the value of labour? 'We can therefore say that for Ricardo the analysis of the effect of changes in the rate of distribution on changes in relative prices was—along with presenting the labour embodied theory of value—an important task to be undertaken by a theory of value. If so, then even if one is addressing the relative price of individual goods, a considerable difference can presumably be seen between the approach of the classical school and that of the neoclassical school. In the interpretation of Ricardo undertaken by Sraffa from the perspective of Marshallian analysis, therefore, in the end there was naturally a need to supplement the limitations imposed by this perspective, and within this interpretation the question of to what extent it is possible to subsume the problematic aspects of Ricardo's system without leaving anything out arose.

As a result of this limited nature, however, this interpretation of Ricardo from a fixed perspective can be said to have added further clarity; the problem is whether it gets to the heart of Ricardo's system, and, moreover, whether it—on the basis of having given sufficient consideration to theoretical prolificacy—possesses great significance in regard to the development of economics. The latter point has already been broadly discussed, so here I will focus only on the former. The collected writings of Ricardo[94] edited by Sraffa available to us to-

94 The full title is *The Works and Correspondence of David Ricardo*, edited by Piero Sraffa with the collaboration of M. H. Dobb, published for The Royal Economic Society, Cambridge University Press.

day contain essential annotations to various writings in the form of editor's notes. The editor's introduction to the *Principles of Political Economy and Taxation* in Vol. I, in particular, is extremely important as a text that addresses Ricardo's theoretical system. Because this text can be assumed to include the thoughts of Sraffa's collaborator Maurice Dobb, precisely speaking it may not be possible to say that it was a genuine expression of Sraffa's own view of Ricardo. Even if it cannot be described as positive and definitive, however, a clear interpretation of Ricardo can be seen here, so while focusing mainly on this point let us look at how Sraffa's older view is implied by his current interpretation of Ricardo, in which the issue of an entire Ricardian system in accordance with Ricardo's approach must of course be addressed.

One of the results of the internal criticism of the neoclassical school made by Sraffa was to assert—by demonstrating the superiority of the 'constant cost thesis'—the superiority of the classical school, and Ricardo in particular, over the neoclassical school as a system of free competition. What became of this assertion over the roughly thirty years Sraffa dedicated to the study of Ricardo? Does the thesis mentioned above give us the key to getting to the heart of Ricardo's system?

To begin with, when it comes to a general way of thinking about Ricardo's system, that is, how to grasp its crux, Sraffa's earlier assertions have been maintained in his current studies of Ricardo. Ricardo saw the theory of distribution as the fundamental issue in economics—no one would object to this as a first approximation of an interpretation of Ricardo. The question is where to locate the foundation of Ricardo's distribution theory. In the editor's introduction to Ricardo's Principles, Sraffa—by focusing on the process of the formation of Ricardo's system—sought it in the theory of profit.[95] How is the way of thinking that looks for the crux of Ricardo's theory of distribution in his theory of profit that is inextricably linked to his theory of the accumulation of capital connected to Sraffa's earlier view of Ricardo? As is widely known, from the perspectives of both Clark (who attempted to construct a modern theory of distribution) and Barone (who in addition addressed the supply curve that forms the foundation of price theory), the foundational principle of Ricardo's system was to be

95 Within the history of Ricardo studies this way of thinking can be traced back to Patten. 'The relation of the price of food to the rate of profits is the central thought of his early as well as of his later writings, and the charm of his reasoning is mainly due to the able manner in which he groups so many other ideas around this one thought' (cf. Patten, op. cit., p. 334). The view of Biaujeaud on this matter (particularly in H. Biaujeaud, cf. op. cit., pp. 64–66) is a further development of Patten's perspective, and notably approaches Sraffa's way of thinking in the Introduction to Vol. I.

sought in the theory of rent. But even if we limit the question to the law of returns—and this was what he mainly addressed—Sraffa did not emphasise the importance of the law of diminishing returns as much as he did the thesis of invariable returns. His taking up Ricardian economics with a focus on the constant cost thesis, therefore, indirectly meant, as I have already stated, taking a unique perspective regarding the generally accepted interpretation of Ricardo—a perspective that emphasised the law of diminishing returns and the law of rent that was seen as being based on it. Taking this view, today it can presumably be said that Sraffa having emphasised the theory of profit over the theory of rent further clarified this kind of earlier position along with providing a positive demonstration of it.

Here we cannot get into how Sraffa's assertion that the investigation of the process of formation—from the corn-ratio theory of profits to the labour-ratio theory of profits—of the theory of profit at the same time also clarified the process of purifying and fleshing out the embodied labour theory of value through the criticism of Smith's production costs theory,[96] the richly suggestive presentation of issues that accompanied Ricardo's attempt to systematise his theory （his shift from the *Essay on Profits to the Principles*）,[97] or the sound refutation of the accepted view of Hollander and Cannan that saw Ricardo as having retreated from the labour theory of value to the production cost theory.[98] What we must address here is simply the question of how the （classical school） thesis of cost invariability asserted by Sraffa in the past is implied in his interpretation of Ricardo today.

According to Sraffa, the 'centre of Ricardo's system' is the issue of an invariable measure of value. Cannan calls this 'the chimera of an invariable standard of value,' but what was important for Ricardo was not actually seeking a strict measure of value good that would be valid in all places at all times, but rather discovering the conditions that a good must satisfy for its value to remain invariable. In Ricardo the problem of the law of value and the problem of the measure of value thus came to be seen as identical. Naturally, therefore, the so-called theory of modification of value, which took up a revelatory question in the history of economic doctrine, was not pursued for its own sake either, but rather in close connection with the theory of the measure of value discussed above. Moreover, since in general Ricardo's approach to the theory of value is inseparable from the question of distribution, and the foundation of his theory of distribution is sought in a theory of profit, this approach is determined by the

96 Editor's Introduction to Vol. I （*Principles*）, pp. xxx–xxxiv, xxxiv–xxxv, xxxvii–xl.
97 Ibid.
98 Ibid.

latter. His theory of modification of value (which deals with the effects of the proportions of capital composition and the durabilities of capital on value) is thus also addressed not on its own but rather in terms of its relationship to changes in the rate of distribution (rising wages, or, in other words, falling profits). If value relationships are then assumed to change as a result of fluctuations in the rate of distribution or the rate of profit, then the measure of value good must inevitably also undergo changes, and so too, therefore, must the value amount of the total product—even if the physical amount does not vary. If fluctuations in wages lead to changes in the value of the total product it becomes difficult to precisely determine their (inverse) effect on profits. If so, then discovering the satisfactory conditions for an invariable measure of value good that is not swayed by changes in the rate of distribution within an economic system in which the structure of capital and its durabilities differs from industry to industry becomes a critical problem in the theoretical formation of the theory of profit that served as his foundation for addressing the issue of distribution. In this sense, 'the problem of value which interested Ricardo was how to find a measure of value which would be invariant to changes in the division of the product.' [99]

In this way—if we understand the thought behind it—the gist of Sraffa's approach can be stated as follows. Ricardo's theory of distribution is based on his theory of profit (which is viewed in terms of an inverse relationship to wages), and as noted above this theory of profit stands or falls together with the theoretical establishment of a measure of value. He therefore calls the problem of an invariable measure of value, as the theoretical basis for Ricardo's system (in the sense of that which would, if lost, mean the loss of the greater part of the system's theoretical validity), the 'centre of Ricardo's system.' This problem, furthermore, was inextricably linked to the problem of 'absolute value,' an idea that, while it remained in his focus right until the end of his career, Ricardo was never able to clearly develop.

Looked at in this way, the question of whether Sraffa's earlier assertion of the supremacy of the so-called 'constant cost thesis' is implied by his interpretation of Ricardo today must be considered in connection with the problem of an invariable measure of value. As is clear from his first essay on cost (particularly p. 312 and p. 317[100]), the 'constant cost thesis,' which is introduced as the only thesis compatible with conditions of free competition, arises under the following conditions.—If there are no external economies (that is, if the production

99 Cf. ibid., pp. xlvii–xlix.

100 Sraffa, ibid.

conditions of individual firms are seen as independent of each other), individual costs remain invariant even if the output of the industry changes, with the only resultant change being to the number of firms; to the extent that the price of production factors is assumed to be invariant, therefore, the industry in question will have a tendency toward invariable costs. The resulting proposition that production costs are independent of the amount produced was assumed at the root of the way of thinking of the classical school as something that was obviously the case (pp. 279–80[101]). As a remaining question, this thesis being an assumption of classical economists must be demonstrated regarding the system of classical economics itself, and this is one of the topics that Sraffa's current study of Ricardo must presumably address. Taking a different perspective, this issue can be seen in the following light. As I have already stated, if we accept Sraffa's interpretation that in Ricardo's system the problem of an invariable measure of value is inextricably linked to the theory of value, then the demonstration that remains to be conducted as mentioned above must turn toward a theory of the measure of value or theory of modification of value that aims to discover *the conditions under which the value of a good is invariable*. This is the case because in Ricardo's system production costs must be founded on the principle of embodied labour, and the 'constant cost thesis' is thus nothing other than the 'constant quantity of labour [needed to produce a single commodity] thesis' and establishing the conditions that allow for the realisation of this thesis was both an important question (Ricardo's theory of modification of value) for Ricardo's theory of value and the subject of his theory of the measure of value.

Sraffa's approach to the classical school system based on the 'constant cost thesis' is clearly evident in his interpretation of Ricardo today, and since he seems to attach great significance to this I quote here the following passage that seems likely to be overlooked by readers who plunge straight in to the editor's notes to Ricardo's complete works.

> This idea that to every theory of value there corresponds an appropriate 'invariable measure' is evidently based on Ricardo's experience with his own theory, where to the determination of value by embodied labour there corresponds an invariable measure in the shape of a commodity produced by a *constant quantity of labour* (emphasis added); and in so far as there are exceptions to the theory, to the same extent the accuracy of the measure is affected. This correspondence, however, is a peculiar property of Ricardo's theory and does not necessarily apply to other theories. Thus there would

101　Sraffa, ibid.

not seem to be such a relation between the theory that wages determine prices and the 'labour commanded' standard.[102]

Here we cannot get into the question of what sort of light can be shed on the debate between Ricardo and Malthus over the measure of value by taking the 'constant cost thesis' or 'constant quantity of labour thesis' as a first approximation. Nor can we take up the question of what sort of significance the theory of the measure of value advocated by Pigou, who assiduously defended the 'constant cost thesis' against Sraffa, had for his system. I will go no further than to point out that when we follow Sraffa's interpretation of Ricardo, in the latter's system the 'constant cost thesis' stands or falls with the problem of an invariable measure of value. This is the case because in Ricardo's system the problem of an invariable measure of value signified the determination of a higher level condition for the realisation of the 'constant quantity of labour thesis.' In other words—as I have already stated—it is because the problem being addressed was the determination, based on a consideration of the inverse effects of fluctuations in the distribution ratio on relative value, of the conditions for the invariability of the value of a specific good when there are assumed to be differences between the durabilities of capital and proportional composition of capital in each industry.[103]

Moreover, the problem of an invariable measure of value, according to Sraffa, is the 'centre of Ricardo's system.' If so,—since this problem is a higher level form of the 'constant cost thesis'—the confirmation of the 'cost invariability thesis' can be described as the key to approaching the heart of Ricardo's system. We must therefore view the validity of Sraffa's interpretation of Ricardo—which makes the confirmation of the 'constant cost thesis' one of its distinguishing characteristics—as being connected to *the question of whether or not the theory of a measure of value forms the centre of Ricardo's system.* When he talks about the *centre* of Ricardo's system, as has already been suggested, this must presumably be understood here not in the sense of the point empha-

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102 Sraffa, ibid., p. xli, note 1.

103 This is at the same time presumably useful in clarifying the conditions of changes in cost under the hypothesis of perfect competition. J. Robinson reframed this question from the perspective of the neoclassical school (see pp. 176–77 above). This can be seen as an essay on the 'increasing supply price' mentioned above. It is surprising that this having been debated so thoroughly in relation to measure of value theory in the classical school has only been addressed recently, although Viner sees a precursor to Robinson's approach in an essay by Harrod (R. F. Harrod, 'Notes on Supply,' *Economic Journal*, 40, 1930, pp. 240–41). Cf. J. Viner, 'Supplementary Note (1950),' *Readings*, p. 227, note 31.

sised in Ricardo's approach to the issues addressed（the theory of profit）, but rather in the sense of the ultimate premise required in order for Ricardo's law of profit to possess theoretical determinativeness.[104] This is because one aspect of the significance of value theory to Ricardo's system lies in measuring fluctuations in the total value of each type of good in the face of changes in distribution, or, more importantly, in confirming *that no fluctuations occur*, and because the theoretical validity of the law of profit that formed the foundation of Ricardo's theory of distribution was seen as depending on the development of this kind of theory of value.[105]

Nevertheless, even the changes in distribution ratio described above that are important when considering the role of Ricardo's theory of value, or, strictly speaking, his theory of modification of value, cannot be unrelated to the theory of diminishing profits that is inextricably bound up with his theory of capital accumulation. It goes without saying that this theory was centred on the laws of development of industrial societies. And this problem of a measure of value was by no means a problem of a *cross-section* of an economic society at a particular point in time, but rather one concerned with intertemporal *progression* in a developmental system.[106] Sraffa's argument seems to implicitly assume a real *invariable total product* in society. This is so because the meaning of the theory of value（and therefore the theory of the measure of value）is sought only in the effect of changes in the rate of distribution on *total value*. If Ricardo's system is based on what is essentially a developmental theory of reproduction, however, can this assumption be taken as a natural or obvious premise? In order to reach a compromise between Sraffa's assumption and the theory of development that is seen as central to Ricardo's system, the problem of value or the measure of value must be seen as one that can only be taken up in the so-called 'stationary state'［defined］as the limit of development. While he approached it from a different perspective, Lionel Robbins also saw the system of the classical school as a system of 'stationary equilibrium,' but by postulating a variable quantity of production factors such as capital and population his conception differed from

104 Let me give an example to further clarify this point. Pigou's theory of production set out to stipulate the conditions that determine the maximum total production that guarantees maximum total utility. But the theoretical premise ultimately underpinning the system of Pigou's theory of production was the problem of changes in cost（increases and decreases in supply price）. As a result, to the extent we are considering what is stated Part II［of Pigou's *The Economics of Welfare*］, 'the centre of Pigou's system' is the law of variable costs.

105 Cf. *Editor's Introduction*, op. cit., pp. xlviii–xlix

106 See Seijirō Kishimoto, 'Rikaadoo no Keizaigaku Taikei（Ricardo's System of Economics）' *Keizai Ronsō*, 1956, Vol. 78, Issue 5, p. 14 seq.

that of Clark, and was essentially closer to Marshall's idea of long-term stasis.[107] If this approach is permitted, the problem of value or the measure of value can be dealt with under the assumption of long-term stasis, and to this extent Sraffa's above-noted assumption of invariable total product is *ultimately* valid, and the theory of capital accumulation (in which total product is assumed to be variable in line with the variability of the quantity of production factors) is nothing more than an account of the *trend* until a point of equilibrium is reached (where invariability of the amount of production factors arises and constant total product is assumed).

Once we take this view, it presumably becomes necessary to examine Sraffa's own fundamental way of thinking regarding the system of capital accumulation and reproduction theories that forms the basis of his distribution theory as something that exists in the background of his treatment of theory of modification of value and theory of measurement of value. And when we reflect on Sraffa's interpretation of Ricardo after having dug down to this level, it seems that it indeed can be defined as a theory of Ricardo's system from the perspective of the neoclassical school. As I cannot go beyond mere speculation on this final point, I look forward to the systematic study of this issue (the theory of capital accumulation) by J. Robinson, who, among the leading members of the neoclassical school, has been most strongly influenced by Sraffa—at least when it comes to the Sraffa debate—and has most flexibly incorporated his fundamental way of thinking into her own approach. Nevertheless, the perspective contributed by someone like Sraffa, who spent over thirty years ceaselessly engaged in the study of Ricardo (as unresolved questions from his earliest essay onward), cannot be rejected out of hand. With Sraffa's legacy as a milestone, we must move forward on his shoulders.

(**Addendum**)

Why did Sraffa, known for having proposed the theory of imperfect competition, devote himself to the study of Ricardo? This question was the initial motivation that inspired me to write this essay. To resolve the general bemusement I felt about this was therefore one of its aims, but as a result of the many

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107 Cf. L. Robbins, 'On a Certain Ambiguity in the Conception of Stationary Equilibrium,' *Economic Journal*, 40, 1930, pp. 194–214. 'It (Marshall's stationary state) is the stationary state of the classics lifted onto a new plane of scientific precision' (ibid., p. 201). In a slightly later essay (ditto, 'Remarks upon Certain Aspects of the Theory of costs,' ibid., 44, 1934, p. 16, note 1), he defines the theories of the classical school as 'theories of comparative statics . . . with the differences between succesive states of equilibrium explained in technical terms.'

issues raised by Sraffa's works, as preparation for future study I have made a passive effort to roughly position their significance in the history of this field and organise the related literature. As time was limited, this text was put together relatively quickly without sufficient polishing, and as a result my assessment of Sraffa's work may lack validity and omit relevant writings. This is in part due to my desire to raise the evaluation of Sraffa in this country to an appropriate standard, and in part to my inadequate scholarship. In writing this essay, my fundamental perspective or way of thinking owes a great deal to the graduate seminar（Ricardo studies seminar）led by Professor Seijirō Kishimoto. There are parts of this essay that are no more than summaries of the discussions held in these meetings with fellow participants（as reflected in my own eyes）. I also owe no small debt to the suggestions of Shirō Itō and Yoshihiro Taguchi of Doshisha University in advancing my understanding of the neoclassical school.

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