Joan Robinson’s association with three Cambridge ‘revolutions’—imperfect competition, effective demand and capital theory—is examined in the context of her personal and intellectual partnership with Richard Kahn, John Maynard Keynes and Piero Sraffa. Initially, imperfect competition appeared to have successfully extended marginal analysis to all market forms. It also allowed Richard Kahn and Joan Robinson to persuade Keynes to present the main argument of The General Theory in terms of aggregate demand and aggregate supply. By the early 1950s, however, Joan Robinson had rejected the Marshallian methodology and had become a strenuous censor of neoclassical theory. In this paper the origin of her critique is traced to her reading of Sraffa’s Introduction to Ricardo’s Principles.

1. Introduction

Joan Robinson was associated with three major revolutions in economic theory, which took place in Cambridge between the 1930s and the 1960s: imperfect competition, effective demand and the critique of the marginal theory of capital. These developments are associated with the work of three people with whom she had a close relationship: Richard Kahn, John Maynard Keynes and Piero Sraffa. In this paper I focus on the interplay of these revolutions in the context of the personal and intellectual relationships which shaped them.1

2. Kahn

Richard Kahn and Joan Robinson met in the late 1928, after she returned from India—where she had accompanied her husband, Austin—and the prospects of living in Cambridge were still uncertain. Kahn was in the process of writing the dissertation that was to win him a fellowship at King’s in March 1930. For more than 50 years their relationship shaped their intellectual and emotional lives. In answer to friend who had written to him after Joan Robinson’s death in August
1983, Kahn described it in the following words: ‘I first got to know Joan in 1928 and ever since then we have both enjoyed life in various aspects of that word.’

The extant correspondence between Kahn and Joan Robinson consists of about 1000 letters written by her to him between 1930 and 1981 and, unfortunately, only about 50 letters written from him to her between 1932 and 1940. Although most of his letters went astray (apparently Joan Robinson was a great destroyer), what remains gives us enough material to investigate both sides of their relationship.

In fact, there has been much speculation on the nature of their collaboration, in particular on *The Economics of Imperfect Competition*, but little has been written about it. Similarly, the role played by Kahn in the writing of *The General Theory* is controversial, although much has been written about it. Thus, Kahn still appears very much ‘the elusive figure which hides behind the Preface of most Cambridge books’, as Schumpeter aptly put it.

In the opening paragraphs of her 1933 Preface to *The Economics of Imperfect Competition*, Robinson acknowledged Kahn’s contribution: ‘[…] I have had the constant assistance of Mr. R.F. Kahn. The whole technical apparatus was built up with his aid, and many of the major problems […] were solved as much by him as by me. He has also contributed a number of mathematical proofs which I should have been incapable of finding for myself’ (Robinson, 1969, p. xiii). However, as in the case of the collaboration with Keynes, Kahn reacted strongly to the suggestion that he co-authored her book. He wrote to her: ‘You are attributing to me very much more than I am responsible for. What I did was to read what you had written. Most of my attempts to do constructive work (e.g. in regard to Discrimination and Exploitation) ended in failure and it was almost invariably you who found the clue […] My place in the scheme of things is apparently to correct errors in arithmetic’ (letter of 30 March 1933 in RFK Papers, 13/90/1/209–10).

In fact, Kahn’s interest in imperfect competition predated Robinson’s since one of the declared purposes of his dissertation, *The Economics of the Short Period* (1929), was to pursue the line of research opened by Sraffa whose 1926 article proposed ‘to abandon the path of free competition and turn in the opposite direction, namely towards monopoly’ as a way out of the Marshallian inconsistencies (Sraffa, 1926, p. 542).

The main contribution of Kahn’s dissertation was the determination of the equilibrium condition of the firm when the assumption of pure competition is abandoned. Kahn made use of the standard definition of Marshall’s ‘maximum monopoly net revenue’ (Marshall, 1920, p. 397)—the point at which the difference between the monopolist’s supply price and demand price times output is a maximum—to provide an ingenious method of measuring market imperfection (Marcuzzo, 1994, pp. 30–31). At the time the dissertation was written,

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2 Letter to M. Ignatieff, 18 August 1983, in Kahn (henceforth RFK) Papers, King’s College Archives.
3 For an overview of the correspondence between RFK and Joan Robinson (henceforth JVR) up to 1946, see Rosselli (2001a).
4 Marcuzzo (2002) reviews the literature and throws some light on this issue.
5 Quoted by Joan Robinson in her Introduction to Kahn (1976), written for the Italian edition. The English version is unpublished; see JVR Papers, King’s College Archives, i/8.
between October 1928 and December 1929, marginal revenue remained an
unnamed concept.

In the book he tried to write from the dissertation, but left unfinished, the
issue of imperfect competition is overshadowed. However, in his article ‘The
Marginal Principle’, which was part of Chapter VII of that book, bearing the
same title as the dissertation, the equilibrium conditions for a firm in imperfect
competition are fully laid out (see Marcuzzo, 1996b). Unfortunately, the article
was rejected by Frank Taussig when Kahn submitted it to the *Quarterly Journal
of Economics* while he was visiting Harvard early in 1933.6

By that time *The Economics of Imperfect Competition*, which Joan
Robinson began writing between late 1930 and early 1931, was at the proof
stage and about to be published. It all started, according to Austin Robinson’s
reconstruction, ‘as a joint game between Joan and Richard Kahn’ (Patinkin &
Leith, 1977, p. 80), but the drafting of the book, which Joan Robinson nick-
named ‘my nightmare’, was a torment to its author. The exchanges with Kahn
were pressing and demanding because Kahn checked every single passage, with
the final work done on the proofs by mail as Kahn was in America.

As in the case of Kahn’s dissertation, the starting point of *The Economics
of Imperfect Competition* is Sraffa’s proposal ‘to re-write the theory of value,
starting from the conception of the firm as a monopolist’ (Robinson, 1969, p. 6);
the aim of the book was to extend the marginal technique to all market forms.
By this means she hoped to provide an answer to the challenge posed by Sraffa
who questioned the consistency of the Marshall-Pigou apparatus.

At the core of Sraffa’s critique of the Marshall-Pigou apparatus was the
assumed symmetry of demand and supply in the determination of relative prices
of individual commodities produced in competitive conditions. The symmetry,
Sraffa (1925, p. 317) claimed, holds on the condition that the law of variations
in costs has the same degree of generality as the law of variations in demand
price, in relation to the quantity demanded. If costs were not made dependent on
the quantity produced, there could be no symmetry and commodity prices would
be dependent on the expenses incurred in production while demand would
influence only the quantity produced, as the classical theory prevailing before the
advent of the marginal revolution had it.

For both ‘blades of the scissors’ to be effective in the determination of the
price of an individual commodity, both demand and supply price must be made
functions of quantity. It was Sraffa’s contention, therefore, that the assumed
U-shaped form of the average cost curve facing the firm, which is the basis of
the derivation of a rising supply curve for a commodity produced in competitive
conditions, was not a reflection of cost conditions prevailing in reality, but rather
was necessary for the Marshallian theory to validate a theory of value based on
the ‘symmetrical forces’ of supply and demand.

Sraffa questioned the validity of the partial equilibrium approach and the
conditions assumed for deriving a U-shaped average cost curve. The first
criticism pointed to the restrictive conditions necessary for the validity of the

6 The typescript is in RFK Papers, 2/5. It is published in Italian in Marcuzzo & Pasinetti (1999).
partial equilibrium approach: ‘[since partial analysis deals with] only two variables, it is necessary to assume that, when the level of production of a single commodity changes [...] both consumers’ demand and the conditions of production of all other commodities do not change’ (Sraffa, 1925, p. 322; tr. in Panico, 1991, p. 561).

The second criticism was directed against the rationale of the U-shaped average cost curve, namely the two ‘laws’ of diminishing and increasing returns. In the Marshallian apparatus, the two laws exercise their effects by making average costs first decrease and then increase. Decreasing costs are attributed to indivisibilities in some factors, while increasing costs are imputed to the existence of a scarce factor. However, Sraffa argued, in order for a single firm to experience increasing costs it must be assumed that the scarce factor is fixed for the industry, that its allocation among the firms is given and that the number of firms is fixed. This last condition clearly violates the condition of free entry in perfect competition. The case of decreasing costs due to the indivisibility of some factors also violates the assumption of perfect competition, since they could turn any competitive firm into a monopoly. Here, only the introduction of the economies of large scale industry—external to the firm, but internal to the industry—allowed Marshall to maintain the possibility that decreasing costs and perfect competition would both prevail.

Let us now examine how these points are addressed in The Economics of Imperfect Competition.

First, the two laws of increasing and decreasing returns are presented ‘in terms of the supply curves of the factors of production, drawn up in efficiency units appropriately chosen’ (Robinson, 1969, p. 330). According to this formulation, the relation between the price of the scarce factor and its quantity is captured by the elasticity of the supply curve of the factor to the industry, once account is taken of the degree of homogeneity of the factor.

If the factor is perfectly homogeneous in respect to its efficiency in the industry, then the supply curve of the factor is perfectly elastic. If the factor is not homogeneous in efficiency, then the supply curve of the factor must be drawn up not in natural units, but in efficiency units or what she calls corrected natural units. The corrected units are obtained by reducing all units of a factor to a standard measure of efficiency—marginal physical productivity.

If the factor is scarce from the point of view of the industry, the price of the factor per corrected natural unit will increase as more of it is employed, provided that there are no economies of large-scale industry. If there are economies of large-scale industry, the efficiency of the factors can be increased through greater utilisation of indivisible units of one or more factors whose efficiency is enhanced by the adoption of more specialised methods of production as output increases. This occurrence may offset the effect on the supply curve of the factor, for a single firm, deriving from its scarcity.

The two laws can then be restated as follows: increasing returns arise when the employment of more of a factor has a favourable reaction upon the efficiency of the units already employed; diminishing returns arise when the employment of more of a factor has an unfavourable reaction upon the price of the units already employed.
On the issue of the derivation of a supply curve for a commodity, tracing the effects on supply price of a change in demand, Robinson argued that the time horizon is relevant. In the short period, the productive equipment of the firm is fixed and part of the cost of production is fixed irrespective of output; in the quasi-long period the productive equipment is conceived to be adapted to changes of output and all costs, except the minimum reward of the entrepreneur, may vary with output; in the long period the number of firms producing a given commodity may change.

In short and quasi-long period competitive conditions the construction of the supply curve is said to present no difficulties, provided that costs are independent of the conditions of demand (which was precisely Sraffa’s point). When all factors are in elastic supply to the industry and there are no economies of large-scale industries, the average cost does not vary as industry output increases and thus the supply price is constant. When resources are scarce relative to the industry demand, the elasticity of the supply curve of the commodity depends on: (i) the elasticity of supply of the scarce factor; (ii) the elasticity of substitution among factors. However, when there are economies of large-scale industry the average cost of the firms is reduced and the optimum size of the firms may be reduced. The combination of economies of scale and factor scarcity may make the average cost to a firm of optimum size either higher or lower and the supply price may be rising or falling (Robinson, 1969, p. 128).

The problem arises in the long period, since a change in the number of firms may alter its costs. Throughout her analysis Robinson then assumes ‘that there is no change in the cost curves of the firms when the industry expands’ (Robinson, 1969, p. 98).

If conditions of perfect competition prevail, a change in demand for a commodity does not change the slope of the demand curve facing the firm, and the derivation of a supply price does not encounter difficulties on that account. If competition is not perfect and firms therefore face a downward-sloping demand curve, it is likely that a change in the demand directed to the industry is reflected in a change in the individual demand curve facing the firms; it is therefore necessary to know the effect on its elasticity. If a change in the demand for a commodity makes the firm’s demand curve less elastic, the supply price may increase; if it makes it more elastic, the supply price decreases, ceteris paribus.

Full equilibrium conditions for any given industry are then derived both in a perfect and an imperfect market: ‘An industry is said to be in full equilibrium when there is no tendency for the number of firms to alter. The profits earned by the firms in it are then normal’ (Robinson, 1969, p. 93). Since profits are normal when price (Average Revenue, AR) is equal to Average Cost (AC) and firms are in individual equilibrium when Marginal Revenue (MR) equals Marginal Cost (MC), it follows that full equilibrium requires the double condition that MR = MC and AR = AC.

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7 See also Harcourt (1990a, p. 44): ‘[…] she virtually ignored the message of [Sraffa’s] argument that it was, except for some minor empirically unimportant exceptions, inadmissible in competitive theory to assume that supply and demand curves were independent of each other.’
Robinson then proves that the ‘double condition’ can only be fulfilled when the individual demand curve of the firm is tangent to its average cost curve (Robinson, 1969, p. 94). At the output at which the demand curve and the average cost curve are tangential it is also shown that the marginal revenue curve must cut the marginal cost curve.

The conclusion is that, when competition is perfect, ‘marginal and average cost must be equal in equilibrium and average cost must be at a minimum, simply because, if this condition is not fulfilled, competition is not perfect’ (Robinson, 1969, p. 96). When competition is not perfect, since ‘the demand curve for the output of the individual firm will be falling […] the double condition of equilibrium can only be fulfilled for some output at which average cost is falling. The firms will therefore be of less than optimum size when profits are normal’ (Robinson, 1969, p. 97).

Sraffa had argued that partial analysis requires the heroic assumption that the cost and demand conditions of different commodities must be independent. Joan Robinson defended the Marshallian methodology of independence on the ground that, provided the assumptions were explicitly stated, the analysis could be made consistent with them.

Sraffa had argued that the rationale for having first decreasing and then increasing costs was questionable since they rested on an entirely different set of causes (changes in the output of an individual firm and changes in the output of the industry) and that, in general, they were incompatible with perfect competition. Robinson responded that they could be derived consistently from the same principle and furthermore that, in a more general theory of competition, it is possible to allow for different cost and demand conditions, with perfect competition as a special case.

Finally, Sraffa had questioned the validity of deriving the supply curve for an individual commodity from the equilibrium of a firm in a given industry. Joan Robinson argued that, provided that perfect competition and the independence of demand from costs are assumed, a supply curve can be derived: (i) in the short run and quasi-long run, on the basis that, for all firms, marginal cost = price and price = equal marginal revenue; and (ii) in the long run, on the assumption that a normal profit can be defined at which average cost = average revenue. If competition is not perfect, then the supply curve—in any relevant time period—cannot be derived, unless very special assumptions are made about the relationship between the demand curve of the industry and the individual demand curves of the firms and hence their marginal revenue. Robinson concluded that:

It is […] false to suggest, as some writers appear to do, that there is a mysterious difference between the mechanism by which supply price is determined when it is rising and when it is falling. The essential distinctions are not between rising and falling supply price, but between perfect competition and imperfect competition, and between an analysis in which time factors are admitted and an analysis in which they are ignored. (Robinson, 1969, p. 129)

It may be questioned—and indeed it was questioned—whether imperfect competition was a genuine ‘revolution’ or simply a turning point in the history of the subject. A turning point is a fresh start on a different track, which may
or may not subvert previously held convictions or results. On the contrary, a
revolution changes the way we think about fundamental questions and it is
generally opposed to prevailing ways of thinking. Clearly, imperfect competition
falls into the first category (Marcuzzo, 1996a; see also Loasby, 1991, p. 41); by
the early 1950s Robinson had become a severe critic of her book and dismissed
it as ‘a blind alley’ (Robinson, 1978a, p. x). The Keynesian revolution, the
influence of Kalecki, her reflections on Marx, and finally her appreciation of
Sraffa’s rehabilitation of the classical approach, made her sceptical of the
methodology and content of The Economics of Imperfect Competition. However,
at the time it was written the book appeared to provide a way to rescue the
Marshallian partial equilibrium approach from Sraffa’s critique. It also enabled
Kahn and Robinson to influence the transition from the Treatise on Money to
The General Theory, shaping Keynes’s argument in terms of short-period
aggregate demand and aggregate supply, in conditions of a ‘given’ degree of
competition.

3. Keynes

Joan Robinson’s acquaintance with Keynes began slowly, but by the Spring of
1932 it had developed into a warm relationship. She had been a member of the
‘Circus’, the informal discussion group that met from late 1930 to the Spring of
1931 for the purpose of pursuing the arguments of the Treatise on Money to their
full implications. In April 1932, Robinson showed Keynes her article ‘A parable
on saving and investment’ (Robinson, 1933), in which she argued that the
Treatise’s conclusion that an excess of savings over investment leads to a fall in
the price of consumption goods rests on the assumption that the supply curve of
consumption goods is perfectly inelastic. In May 1932, with Kahn and Austin
Robinson, she wrote a ‘Manifesto’ debating a point raised by Keynes in his
lectures, about the mechanism by which an increase in investment led to an
increase in output (see below). In November 1932 Keynes acted as reader of The
Economics of Imperfect Competition for Macmillan and although his report was
not entirely flattering (Keynes, 1973a, pp. 865–868), he was appreciative enough
of the book to recommend publication. He had just accepted an article by
Robinson for the Economic Journal (Robinson, 1951a), praising it as ‘excel-
lent—most beautiful and lucid’ (letter of 16 October 1932 in J.M. Keynes
(henceforth JMK) Papers, King’s College Archives, Cambridge).

Early in 1933, when in America, Kahn urged her to pursue her involvement
in Keynes’s work further. He wrote to her: ‘Naturally, you cannot raise the point,
but if Maynard hints that he would like you to look at his stuff, I do wish you
would. I must confess that I am a bit appalled at the prospect of having the sole
responsibility thrust on to me after my return’ (letter of 2 March 1933 in
RFK Papers, 13/90/1/162–4). A year and half later, when the building blocks of
The General Theory were firmly laid out, Robinson was so confident in her role
that she could write to Kahn: ‘[…] of course I am absolutely full of views about
the Treatise. Would Maynard like me to write him a Preface for the new work
showing in what respects his ideas have altered?’ (letter of 5–6 September 1934
in RFK Papers, 13/90/2/94–6). In fact, it was during that Summer of 1934
that a change occurred in the personal relationship between Keynes and Joan Robinson. She wrote to Kahn: ‘I see Maynard signed “yours faithfully” in type and crossed it out and put ever in ink so I can’t really complain …’ (letter of 15 August 1934 in RFK Papers, 13/90/2/39–41).

In June 1935, Keynes asked Robinson, along with Harrod, Hawtrey and Kahn, to read the second set of proofs of *The General Theory*. In the year following the publication of *The General Theory* Robinson had already published two books following in Keynes’s footsteps. The first, *Essays in the Theory of Employment*, drew ‘riders from the main theory’ (Robinson, 1979a, pp. 185–186); the second, *Introduction to the Theory of Employment*, was ‘a told to the children version of *The General Theory*’, as she put it in a letter to Keynes (Keynes, 1979, p. 185). Keynes initially expressed reservations about efforts to popularise his argument, as he was ‘against hurry and in favour of gestation’ (Keynes, 1979, p. 186) in publicising the new ideas. But when *Introduction to the Theory of Employment* came out Keynes wrote to her: ‘You have been very successful, I think, in simplifying and have skated round the complications beautifully’ (letter of 20 November 1937 in JVR Papers, vii/240/14–5).

Keynes was also supportive of her academic career and once stepped in to prevent others from harming it. When Robinson was still Assistant Faculty Lecturer and applied to become Faculty Lecturer, Keynes acted to prevent her proposal to give a course on Money from being turned down. In a letter of 5 March 1935 to C. R. Fay, a colleague and Fellow of Christ’s, he wrote:

> [ … ] it would be very strong measures, almost unprecedented, I think, to veto a course which a lecturer greatly wanted to give in a case where there is no question as to the quality and the popularity of the lectures or of the lecturer’s services being wanted in some other specific direction. From what I hear, her lectures are exceedingly good and amongst the most successful with the men. But in this particular case, there are, I fancy, some other considerations which come into the picture which it would be very wrong for us to overlook. If these lectures were to be vetoed, it would, I think, give the impression, however unjustly, that an attempt was being made to prevent Mrs. Robinson from preaching on her own line of approach, that we were becoming a sort of London School of Economics, where differences of doctrinal opinion are capable of coming into the picture. I know that this is entirely remote from your mind. But it is important not to give the faintest excuse for its being felt by anyone. […] [Y]ou must not forget that a slightly difficult personal situation does arise precisely because she is inferior in status in a way that probably does not entirely correspond to her attainments. If there were no University lecturers and we were appointing all over again, would she not probably have a superior claim to some of those who now have a superior status? I should think myself that there could be no doubt about it. (JMK Papers, UA/14.2)

The relationship with Keynes also had its difficult moments when she was defending Kalecki’s work against his criticism,8 but the correspondence between them from the mid-1930s onwards confirms that he trusted her judgement and was appreciative of her work.

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8 See the exchange of letters between JVR and JMK (February—March 1941) in Keynes (1973a, pp. 829–836).
Let us now move on to my contention that Kahn and Robinson influenced the presentation of the main argument of *The General Theory* in terms of ‘demand and supply for the output as a whole’.

Early in 1932, Keynes reached the conclusion that an increase in investment always leads to an increase in output (Marcuzzo, 2002). In his lecture of 2 May, he presented his ‘new’ view as follows: ‘Fluctuations of output and employment for a given community over the short period […] depend almost entirely on the amount of current investment […] This […] is the result of taking account of the probable effect on saving of a change in the amount of investment’ (Keynes, 1979, p. 41).

In order to prove that an increase in investment leads to an increase in output he argued that only two assumptions were needed: (i) earnings vary directly with output; (ii) savings vary directly with earnings. Since in equilibrium the increase in saving must be equal to the increase in investment, it follows that any increase in investment inevitably leads to an increase in output. However, he singled out ‘an exceptional case’ in which investment could fail to increase output—when the increase in the cost of capital goods prevented a rise in profits in the sector producing capital goods. Kahn and Joan and Austin Robinson, who were attending Keynes’s lectures, reacted by composing a ‘Manifesto’ 9 arguing that an increase in investment leads directly to an increase in output if it increases the output of consumption goods. According to the authors of the Manifesto, Keynes’s argument proved only that an equilibrium is reached, not that output has increased; they went on to state that ‘The problem seems to us to be susceptible to treatment by the method of Supply and Demand’ (Keynes, 1979, p. 43).

In fact, they argued, in order to prove the relationship between an increase in investment and output two conditions were sufficient (but not necessary): (a) the demand for consumption goods increases when the output of capital goods is increased; (b) the supply conditions of consumption goods remain unchanged in the face of a change in the demand for them. The argument was a generalisation of the mechanism presented in Kahn’s multiplier article of the previous year (Kahn, 1931), which studied the effects of increased investment on the demand for consumption goods and their prices, where the latter depend on the elasticity of the supply curve of the consumption goods. 10

To persuade Keynes of the soundness of the ‘method’ suggested by Austin, Kahn and herself, Joan Robinson wrote to him on 10 May 1932: ‘I believe that like the rest of us you have had your faith in supply curves shaken by Piero. But

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9 They signed the Manifesto ‘The Trumpington Street School’, after the street where the Robinsons lived in Cambridge and where Kahn was a frequent visitor.
10 The typescript of Kahn’s Mattioli Lectures contains the following statement: ‘I regard the most important part of my article [on the multiplier] as being quite different from the view normally taken of it. I dealt with the effect of a higher level of demand on the price-level of consumption-goods by introducing the concepts of the supply curve, and demand curve, of consumption goods as a whole. This is symptomatic of the new method, to be introduced by Keynes eventually in the early drafts of the *General Theory*, of determining price-levels of “output as a whole”, or rather consumption-goods and capital-goods as a whole, in terms of demand and supply’ (quoted in Patinkin, 1993, p. 659n)
what he attacks are just the one-by-one supply curves that you regard as legitimate. His objections do not apply to the supply curve of output—but Heaven help us when he starts thinking out objections that do apply to it!’ (Keynes, 1973b, p. 378).

Keynes seems to have been persuaded. In his Autumn 1932 lectures—whose title was changed from the *Pure Theory of Money* to *A Monetary Theory of Production*—we start finding the expression ‘demand as a whole relatively to supply as a whole’ (Keynes, 1979, p. 53).

When she reviewed Vol. XXIX of *The Collected Writings of J.M. Keynes*, where the Manifesto was published after having been found in the laundry-hamper at Tilton, she gave her hindsight version of the story:

At the Circus, we had got used to the idea that investment determines saving both in a static and in an incremental sense. When production is exhaustively divided into investment-good and consumption-good sectors, the excess of the income of the investment sector over its own saving, that is, its consumption, is equal to the excess of income of the consumption sector over its own consumption, that is, its savings. An increase in the rate of expenditure on investment, beginning at a particular moment, quickly brings about an equal increase in the flow of saving, through the mechanism of the multiplier […] Keynes, in his lectures, was still using the cumbersome *Treatise* definitions, which turn on a difference between saving and investment, but he was using them to get the same results. There was an ‘exceptional case’ which now seems rather hard to grasp, in which an increase in investment fails to increase output. It was about this case that we put in a ‘manifesto’ […] There was an all-day discussion on 8 May 1932 between Kahn, Keynes, and myself which seems to have ‘solved the problem amicably’ (p. 48). Much later (volume VII, p. 400), Keynes explained that he got from Kahn (for better or for worse) the concept of ‘the short-period supply curve of output as a whole’, which was the issue here. (Robinson, 1980a, p. 391)

Thus, Kahn and Joan Robinson did influence the introduction of the method of supply and demand11 in the argument of *The General Theory*, and in particular the use of the short-period supply curve derived in conditions of a given degree of competition. This was the result of their common belief in the validity of the Marshallian apparatus (supply and demand plus marginal analysis), generalised in the work done by them in *The Economics of the Short Period* and in *The Economics of Imperfect Competition*, and extended to deal with the effects on prices and output of consumption goods following an increase in investment, which was first introduced by Kahn in his article on the multiplier.

Much later, Joan Robinson had second thoughts about the assumptions made in *The General Theory*, and maintained that Kalecki’s framework (mark-up pricing and constant marginal cost) was superior to Keynes’s (Robinson, 1979a, p. 186). However, on the issue of price theory there was also disagreement with Kahn, to whom she once wrote bluntly: ‘Cannot we

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11 I disagree therefore with the conclusion reached by Aslanbeigui & Oakes (2002, p. 22): ‘[…] Keynes’s use of the method of supply and demand […] evolved in ways that did not conform to the theoretical ideas of the Circus.’
agree on Piero’s prices for the long run and on Keynes’ prices for the short run and leave it at that?’ (letter of 19 May 1961 in RFK Papers 13/90/6/199–200).

I now turn to Sraffa’s influence in bringing about the other Cambridge revolution to which Joan Robinson contributed.

4. Sraffa

Richard Kahn and Joan Robinson attended Sraffa’s lectures in the academic year 1928–29, but clearly they did not understand the implications of his revival of the classical approach. However, as we have seen, his 1926 article was a major source of inspiration in their early work. In fact, Joan Robinson dedicated to Sraffa a short pamphlet, *Economics is a Serious Subject*, which she published in October 1932. In the original manuscript in place of the anonymous dedication—‘to the fundamental pessimist’—there is the following: “To Piero Sraffa, whose introduction of pessimism into Cambridge has made Economics a Serious Subject.”

*Economics is a Serious Subject. The Apologia of an Economist to the Mathematician, the Scientist and the Plain Man* (Robinson, 1932) dealt with the questions raised in the discussions over Sraffa’s 1926 article, with a more general purpose in mind, i.e. that of defending the methodology of making unrealistic assumptions against the charge of the mathematician, who would defend logic against realism, and the charge of the plain man, who would do exactly the opposite. She later claimed that she did not republish it because she soon ceased to believe in the methodology defended in it (Robinson, 1979b, p. 110).

While writing *The Economics of Imperfect Competition* she was apprehensive of Sraffa’s criticisms, as her correspondence with him and with Kahn reveals. She showed Sraffa a draft of the book and reported to Kahn that although he did not make devastating criticisms, he could not ‘swallow the modern demand curve’ (letter of 18 January 1933 in RFK Papers, 13/90/1/57–8).

In the following years her relationship with Sraffa became very close: they went for long walks together and exchanged opinions on various matters, but only after the war did Sraffa’s work again have a major impact on her. According to the reconstruction she gave in the late 1970s, when in the late 1940s she had been trying to extend the Keynesian analysis to the long period, the stumbling block in the dynamic analysis consisted of ‘the lack of an adequate conception of the rate of profit’ (Robinson, 1980b, p. 107). She argued that on the basis of Keynes’s and Kalecki’s theory of effective demand, only the level of total profits can be determined while to determine the rate of profit it is necessary to define the value of the stock of capital, which at the time, according to her, ‘no one seemed able to do’ (Robinson, 1978a, p. xvi). She later remarked of this period that ‘I had innumerable discussions with Piero Sraffa but they

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12 On Sraffa’s impact on Cambridge economics in the late 1920s and early 1930s, see Marcuzzo (2001d).
13 JVR Papers, file i/2. See Harcourt (1990b).
14 On the correspondence between Robinson and Sraffa up to 1946, see Rosselli (2001b).
always consisted in his heading me off from errors; he would never say anything positive. Thus it was not till I found the “corn economy” in his Introduction to Ricardo’s Principles that I saw a gleam of light on the question of the rate of profit on capital. The new phase opened up by Sraffa’s Introduction to Ricardo’s Principles, led ‘to a new upheaval in ideas, comparable in excitement, though not in immediate practical importance, to the Keynesian revolution itself’ (Robinson, 1978a, pp. xvi–xvii).

Again, the question of Joan Robinson’s priority was raised, this time on the issue of the critique of neoclassical capital theory. It may be helpful to quote what she wrote to Kahn in 1975: ‘It is true that I anticipated Piero’s publication but only because I had more or less worked it out for myself from his Introduction to Ricardo’s Principles the corn economy’ (letter of 25 February 1975 in RFK Papers, 13/90/10/191–2). To clarify what the ‘corn economy’ did reveal to Joan Robinson—a question that has puzzled some commentators15—it may be useful to present Sraffa’s reconstruction of Ricardo’s argument.

The corn-ratio theory—which Sraffa identified as ‘the rational foundation of [Ricardo’s] principle of the determining role of the profits of agriculture’—makes it possible to determine profits ‘by the difference between product and capital advanced.’ Since, in agriculture, by assumption, corn is both the capital (the subsistence necessary for workers) and the product, the determination of the difference between total product and capital advanced to capital advanced ‘is done directly between quantities of corn without any question of valuation’ (Sraffa, 1951, p. xxxi). In the Principles, Ricardo substituted the labour theory of value for the corn-ratio theory, allowing for the determination of the rate of profits on similar lines, namely ‘by the ratio of the total labour of the country to the labour required to produce the necessaries for that labour’ (Sraffa, 1951, p. xxxii).

However, Sraffa argued, a problem arises with Ricardo’s theory of profit because any change in distribution between wages and profits alters the relative values of commodities, including those produced with the same quantity of labour; thus unless a measure of value is found which would be invariant to changes in distribution, it becomes impossible ‘to measure changes in the magnitude of aggregates of commodities of different kind or, what is even more important, to ascertain its constancy’ (Sraffa, 1951, p. xlix).

Ricardo was not able to resolve the problem of the invariant measure of value, but thanks to his corn-ratio theory he was successful, albeit ‘at the cost of considerable simplification’ (Sraffa, 1951, p.xxxii), in rendering distribution independent of value.

By the time Sraffa’s Introduction to Ricardo’s Principles was published, Robinson was ready to grasp Sraffa’s message. Since 1940 she had been studying Marx and even earlier she had praised Kalecki’s approach to effective

15 See for instance Gilibert (1996, p. 123): ‘[The corn-economy model] is highly suggestive, and certainly shows extremely clearly the working of a surplus theory of profits, as contrasted with the usual equilibrium theory. However, it is difficult to see how it could lead to the arguments used by Joan Robinson to question the possibility of finding suitable unit for measuring capital, this being made of a heterogeneous collection of goods.’
demand, which had been suggested by Marx’s Reproduction Schemes. In a 1948 article on Marx she had written: ‘What divides Marx’s theory from others is not at all the question of relative prices of commodities but the question of the total supply of capital and the rate of profit on capital as a whole’ (Robinson, 1951b, p. 139). The point about the rate of profit and the question of the measurement of capital arose again in 1953 in her On Re-reading Marx, a collection of three short essays, ‘written in a hilarious mood after reading Piero Sraffa’s Introduction to Ricardo’s Principles which caused me to see that the concept of the rate of profit on capital is essentially the same in Ricardo, Marx, Marshall and Keynes’ (Robinson, 1973a, p. 247).16

Robinson directly addressed the problem of how capital is to be measured in the aggregate production function in her famous Review of Economic Studies article of 1953, which is widely regarded as the starting point of the capital theory controversies. There she pointed out that for the supply of capital to have any meaning we must know in what units it is measured. While in the short period—where by assumption ‘the supply of concrete capital goods does not alter’ (Robinson, 1978b, p. 77)—the question may remain unanswered,17 in the long period—where changes in factor proportions are taken as functions of their prices—it cannot be evaded. In the long period we need to explain why a particular technique is chosen and the rate at which the stock of capital is altered.

The neoclassical explanation is based on the postulate that the prices of factors of production are such that all their available quantities are employed. At a given wage rate, that technique is chosen which maximises the rate of profit; then the total amount of capital and the chosen technique determine the level of employment. However, she wrote, ‘the condition that the given amount of capital employs the given amount of labour […] entails a particular rate of profit. But the value of the stock of concrete capital goods is affected by this rate of profit and the amount of “capital” that we started with cannot be defined independently of it’ (Robinson, 1978b, pp. 87–88).

The neoclassical failure to distinguish between the conditions necessary for producing a given output from the rules of its distribution, in the form of wages and profit, is here clearly unmasked. The reason is that ‘different factor ratios cannot be used to analyse changes in the factor ratio taking place through time’ (Robinson, 1978b, p. 89) since in time the value of the quantity of capital may change as a consequence of a change in the rate of profit or wages and we will not be comparing the same quantities. She concluded that ‘it is

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16 In fact, far from being in a hilarious mood, Robinson was on the verge of a serious nervous breakdown when she wrote these essays. She explained to Kahn, who tried to persuade her not to publish them: ‘I want to have the family joke about Piero. I cannot pinch 20 years of his life’s work without acknowledgement and acknowledgement in a joke is the only way I can do it. He who runs may ride and he who doesn’t can boil his head’ (letter of 28 October 1952, in RFK Papers, 13/90/5/381).

17 The same point is made in ‘A lecture delivered at Oxford by a Cambridge economist’: ‘The short period means that capital equipment is fixed in kind […] in the long period capital equipment changes in quantity and in design. So you come slap up to the question: What is the quantity of capital?’ (Robinson, 1973b, p. 261).
impossible to discuss changes (as opposed to differences) in neo-classical terms’ (Robinson, 1978b, p. 89).

This is clearly reminiscent of Sraffa’s interpretation of Ricardo’s failure to distinguish between differences in the value of a given output due to conditions of production and changes in the value of a given output due to the rule of distribution.\(^{18}\) As Sraffa made clearer in his subsequent work (Sraffa, 1960), the classical approach is superior to the neoclassical theory because, in the former, distribution is independent of production: wages are determined by social and historical circumstances, and profits are seen as the surplus over the necessities of production, rather than as the remuneration to scarce factors of production. In 1953, as she finally grasped Sraffa’s point, Robinson came to reject the notion of capital as a ‘factor of production’ and the rate of profit as the price which sets the quantity employed. In the same year, 20 years after the publication of *The Economics of Imperfect Competition*, she ‘revisited’ imperfect competition, and boldly claimed:

> The assumptions which were adequate (or which I hoped were adequate) for dealing with such questions [comparison of a price and output of a commodity under conditions of monopoly and of competition, demand and costs being given] are by no means a suitable basis for an analysis of the problems of prices, production and distribution which present themselves in reality. (Robinson 1960, p. 22).

The capital controversy was the ‘revolution’ which made her famous as a fierce critic of the fallacies of neoclassical theory. But it also marked the beginning of her disillusionment with economic theory and with the prospects for settling intellectual disputes through logical arguments. In her last paper, published posthumously, she wrote: ‘It seems to me that the whole complex of theories and models in the textbooks is in need of a thorough Spring cleaning. We should throw out all self-contradictory propositions, unmeasurable quantities and indefinable concepts and reconstruct a logical basis for analysis with what, if anything, remains’ (Robinson, 1985, p. 160).

5. Conclusions

In the midst of her third nervous breakdown, in November 1952, she wrote to Kahn: ‘I have realised more than ever after this do how much one’s whole personality is involved in one’s “purely intellectual” work. I think the reason I have done so much more with a much weaker brain than any of us is because of my extremely simple minded attitude’ (letter of 3 November 1952 in RFK Papers, 13/90/5/352–5). I hope in this paper to have shown that far from being ‘simple minded’, Joan Robinson was intellectually daring. Her boldness explains why three Cambridge revolutions are rightly associated with her name.

References


\(^{18}\) Sraffa refers to ‘the two points of view of difference and of change’ (Sraffa, 1951, p. xlix).


Robinson, J. (1932) *Economics is Serious Subject. The apologia of an economist to the mathematician, the scientists and the plain man* (Cambridge, Heffers).


