R. F. Kahn and imperfect competition

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I

The question has often been raised as to why Keynes in The General Theory accepted the Marshallian framework of perfect competition.¹ This is surprising because he was actively involved in the discussions following the publication of Sraffa's 'The laws of returns under competitive conditions' (Sraffa, 1926) which had launched a severe attack on the Marshallian theory. Indeed, he was responsible for making Sraffa's argument known to English-speaking readers.

In the Spring of 1926, Keynes invited Sraffa to write for the Economic Journal an English version of an earlier article written in 1925. The Italian article, Keynes wrote, had very favourably impressed his co-editor, F. Y. Edgeworth, who had died in February 1926, before he could make the invitation himself.

Sraffa's critique of the assumption of decreasing and increasing returns, under conditions of perfect competition, led to the conclusion that the 'old-fashioned' theory of cost of production, based on constant returns, was a better foundation for a theory of value (Sraffa, 1925). However, in accepting Keynes's invitation (in a letter dated 6 June, 1926), Sraffa outlined the content of the proposed 'sequel' on a different basis, i.e. in terms of an assumed 'generality of some elements of monopoly'. He intended to prove that as soon as imperfection is introduced into a system of competition 'equilibrium is reached in a way extremely similar to that of monopoly and very far from that of competition' (Roncaglia, 1978, p. 13).

In fact, the article published in 1926 proposed, as a way out of the Marshallian inconsistencies, 'to abandon the path of free competition and turn in the opposite direction, namely towards monopoly' (Sraffa, 1926, p. 542).² It was in developing the implications of Sraffa's suggestion that the theory of imperfect competition was elaborated in the late 1920s and early 1930s.

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²See Tarazas, 1979, p. 365: 'Keynes] had no real reason for assuming perfect competition' and Ohlin's famous remark: 'In this as in some other respects Keynes does not seem to me to have been radical enough in freeing himself from the conventional assumptions. When reading his book one sometimes wonders whether he never discussed imperfect competition with Mrs. Robinson' (Keynes, 1973C, p. 196). The assumption of perfect competition is described by Marris, 1991, as the Achilles heel of Keynes's theory.

³On the basis of the 1926 article Keynes asked Sraffa whether he would accept a University lecureship in Cambridge, in a letter dated 25 January, 1927 (Keynes papers, King's College Library, Cambridge; henceforth given as JMK) file L/S; part of the letter is published in Kaldor, 1987). Sraffa resigned from the lectureship in 1931 and in 1935 was made Assistant Director of Research.
The attitude of Keynes towards imperfect competition was described by Joan Robinson as a dismissive one: ‘Neither Roy Harrod nor I could get Maynard to take an interest in “marginal revenue”’ (Robinson, 1979, p. 173). However, we have evidence that he had endorsed Sraffa’s argument: when Harrod presented the concept of marginal revenue in an article submitted to the *Economic Journal* in the Summer of 1928, Keynes rejected the article with a letter of 1 August, 1928, but the same letter reveals a complete endorsement of Sraffa’s point:

Dear Roy, I hope you will save something out of the article. But if you pursue the matter on the basis of assuming full competition will you not be up against all the usual increasing and decreasing returns difficulties—a difficulty, that is to say, as to how firms of different sizes can exist together in conditions of full competition unless there is constant return? I am still an adherent of the theory put forward by Sraffa in his Journal article to the effect that observed results could only be explained by assuming that each producer has within certain limitations his own private and local market.2

Richard Kahn was deeply interested in these questions from the start. According to his later recollection: ‘The impact of [Sraffa’s] article . . . was tremendous, particularly in Cambridge . . . When I first took up the subject at the end of 1927, the questions raised by Sraffa were being eagerly discussed by the best students’ (Kahn, 1984, pp. 23 and 25).

In June 1928 Kahn gained First Class Honours in Part II of the Economics Tripos. Selecting a topic for his Fellowship Dissertation took ‘some months’3 and in the end Keynes agreed to the choice made by Kahn and ‘encouraged by Shove and Piero Sraffa’ (Kahn, 1989, pp. x and xi): ‘The Economics of the Short Period’. The dissertation, which was published in English 60 years after it was presented to the Electors of King’s College,4 turned out to be a major contribution to the development of the theory of imperfect competition.

This paper discusses Kahn’s contribution with a view to throwing some light on the question of why imperfect competition was not incorporated in *The General Theory*, and why it was only with Kalecki that imperfect competition was brought ‘in touch with the theory of employment’ (Robinson, 1969, p. vii).

II

That the real business of Kahn’s dissertation was to pursue the line of research opened by Sraffa is made clear in the Preface, written at the end of 1929, after it was completed.

1 In a letter to Joan Robinson of 1 July, 1933, Harrod wrote: ‘I devised and wrote an article about the M.R. [marginal revenue] curve which I sent to the Journal in the Summer of 1928. Unfortunately the article contained some other matter with which Maynard didn’t agree and he handed it over to Ramsey to refute. I became ill about that time and didn’t bother about it for a year or so. When I looked it up again, I wrote to Ramsey replying to his refutation, and he replied in a letter which I have got, entirely surrendering and indeed providing a rather elaborate mathematical demonstration of my points—these were points other than those connected with the M.R. curve. Meanwhile I became dissatisfied with the article on other grounds and did not press for its publication. I scrapped it, and in 1930 wrote quite a different article but embordered in it my original construction of the M.R. curve.’ See the J. V. Robinson Papers, King’s College Library, Cambridge. (I am grateful to Dominick Harrod for permission to publish this letter.) The details of the episode are given by Phelps Brown, 1980, p. 9.

2 JMK, file EJ 1.2. Copyright The Provost and Scholars of King’s College, Cambridge, 1993. Permission from King’s College to publish this letter is gratefully acknowledged.

3 The letter with which Kahn informed Keynes that he would not be given access to the Midland Bank statistics for the original topic proposed by Keynes (Kahn, 1989, pp. x–xi) is dated 10 October, 1928 (JMK, file U.A. 5.2). It is unlikely therefore that ‘Kahn began working on his dissertation in September 1928’ (Maneschi, 1988, p. 156).

4 The dissertation was published first in Italian (Kahn, 1983).
Kahn attributed the originality of his work to 'the position of pre-eminence... assigned in the later stages of the Dissertation to the imperfection of the market' (Kahn, 1989, p. viii). This claim was reinforced at the time of publication: '... the importance of my Dissertation largely rested on its treatment of imperfect competition' (Kahn, 1989, p. xii), although with a slight change of emphasis in the acknowledgements.\footnote{The development of my thinking on imperfection of the market is attributable mainly to Sraffa’s article, as well as to my extensive talks with him (Shove also had an important influence)’ (Kahn, 1989, p. xvi). In the 1929 Preface the expression used to acknowledge Shove’s influence is stronger: ‘Much of what I now believe to be my own must in reality belong to him’ (ibid., p. ix). The role of Shove in the development of the theory of imperfect competition is hard to assess, both because he did not write much and because he left instructions that all his papers were to be destroyed after his death (Kahn, 1987). Apart from his published articles, we can rely on the lecture notes taken by J. Saltermarsh in the academic year 1928-9, which are deposited in the King’s College Library. For an attempt to evaluate Shove’s contribution to the development of imperfect competition in Cambridge, see Marcusz, 1991.}

The importance Kahn gave to the road opened by Sraffa is even greater in his The Making of Keynes’ General Theory: ‘Economists throughout the world owe to Sraffa’s articles, and to Sraffa himself, the idea that if economics is to become more realistic it is most important to develop the economics of imperfect competition’ (Kahn, 1984, p. 26).

Kahn’s major role in the development of the theory of imperfect competition remained unnoticed in the literature until the publication of the dissertation, but it must have been obvious to his contemporaries. Joan Robinson, with whom the theory of imperfect competition is mainly associated, first published an article on the subject in 1932. In presenting the ‘double’ condition of equilibrium of the industry (marginal revenue= marginal cost and price=average cost) as the tangency of the individual demand curve of the firm to its average cost curve, she appended the following footnote: ‘I am indebted for this proposition to Mr. R. F. Kahn, who, in turn, derived it by pursuing Mr. Sraffa’s argument to its necessary conclusion’ (Robinson, 1932, p. 547n).\footnote{In the opening paragraphs of the 1933 Preface to the Economics of Imperfect Competition, Joan Robinson wrote: ‘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).}

The purpose of The Economics of the Short Period is to explain the behaviour of firms in the depression of the late 1920s, using the statistics of the cotton and coal industries in Great Britain. Its focus—the short period—is a situation in which plants and machinery are assumed to remain unchanged. The short period has two aspects: the first is the nature of the costs incurred by the firm, reflected in the shape of its prime cost curve; the second is the shape of the individual demand curve. The short period is characterised by two types of cost: quasi-fixed costs, which remain unchanged irrespective of the level of output, and prime costs which are responsive to changes in output.

The main question addressed in Kahn’s dissertation is the determination of equilibrium output and price for the firm and for the industry when the assumption of competition is abandoned. Competition is defined as perfect only when three conditions are fulfilled:

(a) There must be a large number of separate firms, each producing an output which is small in relation to the aggregate output;
(b) There must be no agreement, however informal, among producers controlling a substantial portion of the aggregate output;
(c) The market in which the output of the industry is sold must be perfect. A perfect market is one in which differences of price (after costs of transport have been allowed for) cannot persist over...
an appreciable period of time. If a single firm raises its price in a perfect market, either its output is rapidly reduced to zero or the other firms raise their price. (Kahn, 1989, pp. 12–3)

These conditions are said to be independent because ‘condition (c) may hold where conditions (a) and (b) do not hold. On the other hand, conditions (a) and (b) are often adequately satisfied in a market that is by no means perfect . . . ’ (Kahn, 1989, p. 13).

Equilibrium in perfect competition requires each firm to equate marginal cost with price. This, in turn, requires, for the determinateness of equilibrium, marginal cost to be rising around the point of equilibrium. The importance of the law of equality between marginal cost and price in the determination of the equilibrium of the firm ‘depends upon how early in its course the marginal prime cost begins to rise. If it only begins to rise when the output is about normal, the law can have no reference to a firm whose output is less than normal’ (Kahn, 1989, p. 15).

Kahn’s next step is to investigate the shape of the firm’s prime cost curves by looking into the technical method with which output can be varied in the short period. In the face of a fall in demand, and on the assumption that the effective length of the working day is given, the firm has to decide ‘whether to work part of the machinery every day or all of the machinery only some days’ (Kahn, 1989, p. 46). The crucial factor is the quasi-fixed element of costs, i.e. the expenditure on fuel, lighting, repairs and salaries of foremen and keymen. This is greater when production is carried on every day—which we shall call Method (i)—than when the number of days on which work is done is reduced, which we shall call Method (ii). However, when production is reduced by reducing the number of machines employed, as in Method (i), it is the degree of uniformity of machinery which plays a major role.

If the machinery is equally efficient, the average prime cost decreases continuously until it reaches a minimum at the point of full capacity output (Fig. 1).

If the machinery is not uniform, and more inefficient machinery is used to increase output, then minimum cost is reached at a lower level of output. The cost curve takes the characteristic U shaped form, until full capacity output is reached (Fig. 2).

With Method (ii), i.e. when the number of days of production is reduced, the fixed costs involved in the periods of idleness are constant, whatever the length of the period of stoppage. Since the difference between the total cost of a full working day and the fixed cost per day—which is called the prime cost per day—is independent of the length of the
period over which production is daily carried on, it follows that, for any given level of a
day’s output, the average prime cost—i.e. the ratio of the prime cost per day and the daily
output—is independent of output. Therefore marginal prime cost is equal to constant
average cost until full capacity is reached.

Comparing Method (i) and Method (ii), we can see that there are two critical levels of
output where the two curves meet and the cost is the same with either method (Fig. 3).
At X, the point of full capacity output, all machines are used each working day. Up to Y,
where the two curves cross, costs are lower with Method (ii) than with Method (i),
because working fewer days entails lower quasi-fixed costs.

In the range from Y to X, working every day with a reduced number of machines is
more economical than reducing the days in which production is carried on, assuming
that the machinery is not uniform. The greater the importance of quasi-fixed costs and
the more uniform the machinery, the higher will be the level of output at which the two
curves cross, and—consequently—the wider the range for which Method (ii) is more
economical. Indeed, Kahn produced evidence which showed that the most common
method of reducing output in the cotton industry and in coal mining was ‘to close down
the whole plant on some days and to work the whole plant a full shift on other days
(Kahn, 1989, p. 57).
The shape of the prime cost curve—a reversed L—and the evidence of short-time working in the cotton and coal industries during the Depression, are a serious challenge to the theory of perfect competition. When faced by a perfectly elastic demand curve, a constant marginal cost curve loses its significance as the determinant of output. Whenever the price exceeds the average cost curve, firms are supposed to be producing at the full capacity level of output. But if this were so, the only firms that worked below capacity would be the inefficient ones whose prime cost exceeded price, and this goes against the evidence. Therefore the conclusion is that ‘the existence of short-time must often be incompatible with a state of perfect competition’ (Kahn, 1989, p. 83).

The next step is to introduce the assumption of an imperfect market. The main difference with a perfect market is that output is no longer determined by the equality of price and marginal cost. As in monopoly ‘the product of output and the difference between price and average prime cost [is] a maximum’ (Kahn, 1989, p. 86). Kahn applies here the standard definition of ‘maximum monopoly net revenue’ provided by Marshall (1961, p. 397), but he provides also an ingenious method of defining market imperfection.2

Assuming a linear demand curve and a perfectly horizontal prime cost curve until full capacity output is reached, Kahn starts his analysis by proving the following equation:

\[ \frac{p - r}{x} = \tan \theta \]

where \( r \) is the average prime cost, \( x \) the maximising profit level of output, \( p \) the corresponding price and \( \tan \theta \) the slope of the individual demand curve. At the equilibrium level of output \( \tan \theta \) is then equal to the excess of unit price over unit prime cost. This can be expressed as:

\[ p - r = f q \quad f \leq 1 \]

Where \( f = \frac{x}{x^*} \) is the ratio of \( x \), to the capacity output, \( x^* \), and

\[ q = x^* \tan \theta \]

In Fig 4 we have drawn two demand curves with identical slopes and an average cost curve shaped as a reversed L. As the demand curve and the cost curve are both straight lines, the maximum net revenue is given at a level of output equal to half the horizontal cathetus and at a level of price corresponding to a point equal to half of the vertical cathetus of the triangle formed by each demand curve with the horizontal segment of the average cost curve. The tangent to the angle formed by the demand curve with the average cost, \( q \), when \( x^* \) is set equal to 1, is called by Kahn the ‘annihilation coefficient’. In his own words, ‘... the function \( q \), which would be equal to the gradient of the individual demand curve if the capacity output were the unit of output, is a measure of the imperfection of the market...’ (Kahn, 1989, p. 121). The rationale for this name is that, for a linear demand curve, \( q \) is the increase in price necessary to reduce output by an amount equal to capacity output. In fact, a useful graphic interpretation of \( q \) is that it is equal to the ‘vertical distance between the points at which the individual demand curve cuts the y axis and the ordinate at the position of capacity output’ (Kahn, 1989, p. 121n).

1 Cost conditions under a monopoly are represented by Marshall with a downward-sloping supply curve. With a downward-sloping demand curve, the maximum revenue corresponds to the point at which the difference between the two curves times output is a maximum.

2 At the time the dissertation was written, marginal revenue was still an unborn concept. For a discussion of the history of the marginal revenue concept and its bearing on the development of the theory of imperfect competition in Cambridge, see Marcuzzo, 1991 and 1994.
When demand is equal to $D'$, $p - p' = q$ and $f = f' = 1$, i.e. the equilibrium level of output is full capacity. In this case, the difference between the profit maximising level of price, $p'$, and the average cost, $r$, is equal to $q$, given that $p - p' = p - r$.

When demand drops to $D''$, $p' - r = q$, the maximising net revenue level of output falls to $x''$, i.e. to $f'' (< 1)$ of capacity output and $p$ falls of $(1 - f'')q$. In this case the difference between the profit maximising level of price, $p''$, and the average cost, $r$, is less than $p' - r = q$.

In general, at any level of demand for which $p - r > q$, for $q > 0$, the equilibrium level of output is the full capacity output. For levels of demand for which $p - r < q$, the maximum net revenue level of output is less than full capacity. A proportionality is therefore maintained between $f$, i.e. the degree of utilisation of the plant, and the difference between price and cost, which is given by $q$: 'Imperfection of the market is now playing the role for which it was cast. It provides an explanation of the apparent paradox that firms work short time although they are making a prime profit' (Kahn, 1989, pp. 122–3).

For a linear demand curve, when $x^*$ is set equal to 1, $q$ is equal to its slope. So the flatter the demand curve is, *ceteris paribus*, the lower the degree of imperfection of the market will be. When the demand curve is perfectly horizontal, $q = 0$ and the market is said to be perfect.

**III**

It is well known that Kahn had a very active role in providing the building blocks of *The General Theory*. However, although Keynes set his analysis in the short period, and made full use of the multiplier, he disregarded the lesson of *The Economics of the Short Period*, i.e. the existence of constant marginal costs and imperfect competition. He preferred to follow the traditional Marshallian assumptions and chose to reject only the second

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1 See Harcourt, 1994, p. 19: '... a mystery remains ... as to why Kahn himself, after having made such remarkable advances in the analysis of actual pricing behavior in his 1929 dissertation, reverted to short-period Marshallian theory in his 1931 article and allowed Keynes to do the same in Chapter 21 of *The General Theory*. '
postulate of the ‘classical’ theory.¹ The unfortunate consequence was that he was then forced to accept the conclusion that real wages fall when output increases.

We can read what Kahn said in an interview he gave in 1988:

Keynes, in his General Theory, accepted the Marshallian Doctrine of Diminishing Returns. Higher levels of output involved bringing into production the less efficient plants, which were closed down when the economy plunged into recession. He accepted the Marshallian doctrine that the real wages are determined by the productivity of labour working on the least efficient plant. Although he was well aware of that fact that competition is far from perfect, for the sake of simplicity he assumed in his General Theory competition to be perfect (so far as I recall, neither Joan Robinson nor I remonstrated). In articles published in the late 1930s John Dunlop (Dunlop, 1938) and Lorie Tarshis (Tarshis, 1939) produced statistics demonstrating that real wages were not lower at the height of a boom than in a slump. Keynes wrote an article (Keynes, 1973A, Appendix, pp. 394–412) based on their articles and on work done by Michal Kalecki. He was most anxious to accept this view. It added a fortiori force to his case if higher levels of employment could be secured without any damage to the level of real wages. If his conclusion was valid Keynes attributed this validity to a curious coincidence—that (for reasons not clearly explained by Michal Kalecki) with a rising level of output the degree of competition increases to an extent that it offsets the fall of the productivity of labour working on the least efficient plants. (Kahn, 1988, pp. 94–5, my italics)

In the above-mentioned article, Keynes accused Kahn of having made him, on the basis of the analysis presented in the ‘multiplier article’, retain the assumption of increasing costs.² Kahn was perhaps a little too generous in accepting the blame.³ In fact it is clear that Kahn’s position in the ‘multiplier’ article—which includes an echo of the dissertation analysis⁴—is more complex than the simplified version attributed to him.⁵ Let us for instance, take the following paragraph:

At normal times, when productive resources are fully employed, the supply of consumption goods in the short period is highly inelastic. The building of roads carries with it little secondary employment and causes a large rise in prices. But at times of intense depression, when nearly all industries have at their disposal a large surplus of unused plant and labour, the supply curve is likely

¹ This provoked Shove’s sharp comment: ‘I thought you were too kind to the “classical” analysis as applied to the individual industry and firm. Unless very artificial assumptions (e.g. perfect and instantaneous fluidity of resources) are made, it seems to me either wrong or completely jejune’ (letter of 15 April, 1936 in Keynes, 1973C, p. 1).
² ‘Like Marshall, Prof. Pigou based his conclusion [shifts in real demand are associated with shifts in the opposite sense in the rate of real wages] primarily on the stickiness of money wages relatively to prices. But my own readiness to accept the prevailing generalisation, at the time when I was writing my General Theory, was much influenced by an a priori argument, which had recently won wide acceptance, to be found in Mr. R. F. Kahn’s article on “The Relation of Home Investment to Employment”, published in the Economic Journal for June 1931. The supposed empirical fact, that in the short period real wages tend to move in the opposite direction of the level of output, appeared, that is to say, to be in conformity with the more fundamental generalizations that industry is subject to increasing marginal cost in the short period, that for a closed … system as a whole marginal cost in the short period is substantially the same thing as marginal wage cost, and that in competitive conditions prices are governed by marginal cost; all this being subject, of course, to various qualifications in particular cases, but remaining a reliable generalisation by and large’ (Keynes 1973A, Appendix, pp. 399–400).
³ The General Theory is based on the whole, on the economics of the short period. It was assumed that short-period supply curves were rising curves. Work done by J. G. Dunlop and Lorie Tarshis threw doubt on this assumption. Keynes rightly attributed his error to me’ (Kahn, 1976, p. 32n).
⁴ See p. 33, n. 1.
⁵ The same view is held by Brown (1991, pp. 447–8): ‘… it is not at all clear that Kahn’s article [the “multiplier article”] says what Keynes imputes to it. …’ Thus while there are similarities in the approach of Kahn and of Keynes to the importance of factor nonhomogeneity in determining the shape of short-period cost curves, on the crucial issue of the relation between prices and employment in a recession Kahn was not inclined to argue in favour of falling marginal productivity.’
to be very elastic. The amount of secondary employment is then large and the rise in prices is small.

If there is in existence a large stock of surplus resources that are not very inferior to the worst of those that are actually being employed, the elasticity of supply is likely to be very large indeed up to the level of output at which this surplus would be becoming inappreciable. Provided that output is not carried above this level, an expansion of employment bears with it only a very small rise of prices. (Kahn, 1972, pp. 10-11)

The statement for which he accepted responsibility, ‘the supply of consumption goods in the short period is highly inelastic’, does not do full justice to the analysis presented either in the article or in the dissertation.

Once Keynes had accepted the standard assumption of a rising marginal cost curve he was only half way towards the inescapable conclusion that when output increases real wages must fall; the other half was provided by the assumption about competition. In fact, two steps have to be taken to reach the conclusion that there is an inverse relationship between employment and real wages, on the basis of the theory of effective demand:

(i) the assumption of diminishing productivity of labour;
(ii) the assumption of a given degree of competition.

The argument runs as follows: profit maximisation requires the marginal cost of labour to be equal to the value of the marginal product of labour. In perfect competition, the marginal cost of labour is the money wage and the value of the marginal product of labour is the marginal product of labour times the price of output. If marginal productivity is assumed to be decreasing and competition is assumed to be perfect, real wages must fall with any increase in employment.

Keynes made it clear in a letter to H. H. Henderson, two months after The General Theory was published, that:

As regards prices, I should remind you that, according to my theory, the rise of prices during a boom is due partly to the rise in the wage unit and partly to the non-homogeneity of resources. Apart from wage changes, it is a consequence of decreasing returns and the employment of less efficient factors. As the quantity of factors employed increases, diminishing returns set in, owing to the employment of less efficient factors, and in addition increasing competition tends to raise their price. (Keynes, 1979, p. 223)

However, Keynes distanced himself from the classical theory by adopting money wages as the unit of measurement, on the basis of an assumed proportionality between prices and money wages. But, with diminishing returns, prices can never be made proportional to costs, while retaining the assumption that firms always try to maximise profit, if competition is also assumed to be perfect. Therefore, either the proportionality between money wages and prices or the assumption of diminishing returns must be abandoned. On the other hand, if imperfection of the market is allowed for, while retaining the assumption of diminishing returns and of profit maximisation, the proportionality between money wages and prices can be maintained only by assuming a variable degree of competition. If constant returns are assumed to prevail, the proportionality between

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1 The following footnote is appended here: ‘As is par excellence, the case when the short-time method of working plant is in operation over a wide field’.
money wages and prices can be maintained only by assuming perfect competition or that
the degree of competition is constant.\footnote{1}

For the force of the main argument of The General Theory—that effective demand
governs output and money unit wage costs govern prices—it seemed safer if not 'simpler'
to retain as many assumptions of the received doctrine, as possible.\footnote{2} After all, The General Theory was meant to show 'the flaw in that part of the orthodox reasoning which leads to conclusions which for various reasons seem to me to be unacceptable' (Keynes, 1973b, p. 489, my italics). However, the evidence for constant real wages over the cycle showed
that the quest for simplicity endangered the realism of the theory.

IV

As Kahn told us, Keynes was particularly anxious to account for statistical evidence
showing a remarkable constancy of real wages. In the Autumn of 1937 he sent the
following letter to Sraffa:

Dear Piero,

Do you think the following would provide a useful and promising subject on which to get some
of your suitable research students to think. If the idea appeals to you, you might explain the
problem in seminar and ask for discussions of it. The point is as follows: On page 8 of the enclosed
you will find a column giving the percentage of the national income in USA, which has been
distributed as wages and salaries annually from 1919 to 1935. You will notice that this has been
virtually stationary, the maximum fluctuations for the period for any year being between 66.5 and
69.2. This covers a period during which prices and wages have fluctuated widely, including two
major credit cycles, and covering years during which the income to be divided fluctuated by 100
per cent. What is the explanation of this stability?

There are also other statistics for other circumstances, countries and dates, for which I believe
the percentage of wages and salaries come out very close to 66 per cent.

I can think of long period explanations which might explain such a phenomenon over a period
of time, but I can think of no plausible explanation for the year to year stability between, for
example, 1929 and 1933.

Could your young men rack their brains (a) to discover how far the alleged statistical fact really
is a fact, (b) if so, how far it means what it appears to mean and is not simply a statistical illusion
arising out of the way in which the figures have been compiled, and finally (c) if the facts are as they
appear to be, what on earth is the explanation? Yours ever, JMK.\footnote{3}

1 In perfect competition, profit maximisation requires that: $p = MC$, where $p$=price and $MC$=marginal cost.
Moreover, $MC=\omega/P_{mg}$, where $\omega$=money wages and $P_{mg}$=marginal productivity of labour. According to
Keynes, if there is an increase in employment, money wages will rise [$\omega'=\omega' (1+\omega)$] and the marginal
productivity of labour will fall [$P_{mg}'/=P_{mg} (1+b)$]. It follows that, if profits are to be maximised, prices
must rise of $(\omega+b)>\omega$ and therefore that the real wage must fall. Prices are made equal to costs but they are
not proportional to wages. In these circumstances, prices can be made proportional to wages only if the
marginal productivity of labour is assumed to be constant. Under imperfect competition, profit maximisation
requires that $MC$ is equal to $MR$, where $MR=p(1-1/\epsilon)$ is the marginal revenue and $|\epsilon|$=elasticity of
demand. It follows that $p(1-1/\epsilon)=\omega/P_{mg}$, and $p=\omega(1/(1-1/\epsilon))P_{mg}$. If $P_{mg}$ is assumed to be constant,
the proportionality between wages and prices, i.e. the constancy of the real wage, implies that $(1-1/\epsilon)$,
which is the degree of monopoly, is constant. If it is assumed that $P_{mg}$ is decreasing, the constancy of the
real wage requires an offsetting change in the degree of monopoly. I am indebted to Annalis Rosselli and
an unknown referee for clarifying this point.

2 According to Kregel (1987, p. 494) Keynes was concerned not to adopt the assumption of imperfect
competition, because "any reduction in the equilibrium level of employment could then be credited to the
changed assumption concerning competition". See Marris (1992) for the view that Keynes's tactic was only
partly successful.

3 Letter of 18 October, 1937, JMK papers, file UA 5.4. Copyright the Provost and Scholars of King's
College, Cambridge, 1993. Permission from King's College to quote this unpublished letter is gratefully
acknowledged.
Kalecki took part in Sraffa’s seminar while he was in Cambridge on a research grant from the University, from January to June 1938. It is tempting to speculate that he was challenged to answer the question posed by Keynes on the basis of his version of the theory of effective demand.

In the article published in April 1938 in *Econometrica*, Kalecki tackled the issue by rejecting the assumption of perfect competition as incompatible with the observation that most firms work below capacity. Starting from the definition of the degree of monopoly, $\mu$, as the ratio of the difference between price, $p$, and marginal cost, $r$, to price:

$$\mu = (p-r)/p.$$ 

Kalecki shows that, the average aggregate degree of monopoly is given by:

$$\mu = (C+D+S)/T$$

where $C$=aggregate profit and interest; $D$=aggregate depreciation; $S$=aggregate salaries and $T$=aggregate turnover, i.e. the value of aggregate transactions. The argument runs as follows. For each firm the short-period marginal cost, $r$, is the sum of the short-period depreciation $d_m$, wages $w_m$, and raw materials, $m_m$. The price is equal to the sum of the corresponding average costs, $d_a$, $s_a$, $w_a$, $m_a$, and the average capitalist income (profit and interest) $c_a$. By subtracting the marginal costs from the corresponding average values, we get

$$p - r = c_a + (d_a - d_m) + (s_a - s_m) + (w_a - w_m) + (m_a - m_m).$$

Substituting $\mu$ for $p-r$ in the above equation and multiplying both sides by the output of the firm and aggregating for all firms we get:

$$\sum \chi \mu x = \sum \chi x c_a + \sum \chi (d_a - d_m) + \sum \chi (s_a - s_m) + \sum \chi (w_a - w_m) + \sum \chi (m_a - m_m)$$

It is assumed that for some costs the marginal value is small in comparison with the corresponding average value, so $\sum \chi d_a$ and $\sum \chi s_m$ are negligible; $\sum \chi (d_a - d_m)$ and $\sum \chi (s_a - s_m)$ can be represented as $D(1-\alpha)$ and $S(1-\beta)$. Moreover, $\sum \chi (m_a - m_m)$ is equal to zero, since the marginal cost of raw materials is constant and raw materials are regarded as variable costs; while $\sum \chi (w_a - w_m)$ is likely to be small in comparison with $W$ the aggregate wage, so that it can be represented as $\gamma W$, where $\gamma$ is a small positive or negative fraction. So we can write the above equation as:

$$\sum \chi \mu x = C+D+S - (Da + S\beta - \gamma W)$$

On the basis of the assumption that $Da$ and $S\beta$ are small in relation to $C+D+S$ and so is $\gamma W$, since according to the statistical evidence $W$ is less than half of income, i.e. less than $Y-W=C+D+S$, Kalecki concludes that $(Da+S\beta-\gamma W)$ is small in comparison with $C+D+S$. We have then:

$$\sum \chi \mu x = C+D+S.$$ 

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1. See the editorial notes in Kalecki, 1990, p. 506.
2. In his review of *The General Theory* in 1936, Kalecki had already presented the theory of effective demand in its 'more general case, which includes also imperfect competition'. See Kalecki 1990, p. 224.
3. Kalecki assumes that there are three types of industry, according to the shape of their average wage-cost curve (falling, constant, rising) and he further assumes that 'the greatest part of income is produced under conditions of slowly changing manual-labour cost, and thus by enterprises for which $w_a - w_m$ is small in comparison with $W$' (Kalecki 1938, p. 101). For the other two types of industry, $w_a - w_m$ is not small in comparison with $W$ and it is either positive or negative.
By dividing the latter equation by the turnover \( T(=Ex) \) we get:

\[
\frac{\Sigma x/j}{\Sigma x} = (C+D+S)/T
\]

which is the definition of the average degree of monopoly of the economy.

If both sides of the latter equation are multiplied by the ratio of turnover, \( T \), and gross income \( Y \), we get the relative share of capital income, depreciation and salaries in the total income:

\[
\mu T/Y + (C+D+S)/Y
\]

What has to be explained is the observed stability of \( \mu T/Y \), which is equal to \( (Y - W)/Y \).

First, Kalecki noted that \( \mu \) and \( T/Y \) are not independent, since a change in the degree of monopoly influences the ratio of turnover to income: 'a rise (fall) of a degree of monopoly causes a decrease (increase) of \( T/Y \) but in a lesser proportion' (Kalecki, 1938, p. 106).

However, changes in \( T/Y \) can 'be caused by influences other than a change in \( (\mu) \)' (Kalecki, 1938, p. 108). If prices of raw materials fell relative to wages, \( T/Y \) decreases, although less than proportionally, while the reverse happens when prices rise relative to wages. So the ratio of turnover to income is likely to rise in a boom and fall in a slump, because prices of basic raw materials rise in relation to wages in a boom and fall in a slump. Changes in the degree of monopoly are more difficult to assess, but if the value of \( \mu T/Y \) appears to remain constant in the cycle, it means that \( \mu \) increases in the slump and falls in the boom. Kalecki thus concluded that 'the apparent stability of relative shares in the cycle is in reality the effect of the 'opposite change' of \( \mu \) and \( T/Y \)' (Kalecki, 1938, p. 111).

It must be noted that Kalecki’s result is meaningless under perfect competition, where \( \mu = 0 \). His result applies to a situation in which firms are working below full capacity and under constant marginal costs.\(^1\)

Kalecki’s explanation of the stability of the wage-share rests on the assumption of a \textit{varying} degree of competition and in particular on the view that the degree of monopoly varies inversely with the level of economic activity.\(^2\) So Kalecki challenged both the assumption of perfect competition and of rising marginal costs, as Kahn had done, but he added a further assumption, i.e. that the degree of competition \textit{varies} in the cycle. As a result, his version of the theory of effective demand did not require the real wage to fall with employment. Forced to reconsider his position, Keynes had to concede a point,\(^3\)

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\(^1\) Kalecki’s result can be justified under two cases. The ‘strong’ case is a situation where for each firm \( i \), salaries and depreciation are fixed costs and raw materials and wages are variable costs. Given the total cost function, \( T C_i(x) = C_i + D_i + S_i + (w_i + w_i')x_i \), since marginal costs, \( MC_i = w_i + w_i' \), are assumed to be constant, it follows that \( p_x = C_i + D_i + S_i + w_i + w_i' \). Given that \( \mu = (p - MC)/p_0 \), it follows that \( \mu p_x = p_x - MC = C_i + D_i + S_i \). The ‘weak’ case is when this result is obtained in aggregate. While the average cost of raw materials is always considered constant, the average cost of wages is allowed to vary, according to the type of industry. While for any given industry the difference between the average wage and the marginal wage can be positive or negative, in aggregate these differences cancel out and aggregate constant marginal costs are obtained.

\(^2\) Kalecki’s view that there is a basic tendency for the degree of monopoly to rise in the slump and to fall in the boom is expressed in a number of places. See Kalecki, 1971, p. 51 and 1969, pp. 53–4. This view was held also by Joan Robinson: '... there is a strong tendency for the degree of monopoly to increase as effective demand falls off, while amalgamations formed in slump conditions tend to break down as trade improves. (Cf Pigou, Theory of Unemployment, p. 135). Thus changes in the degree of monopoly tend to amplify the swing of movements in effective demand initiated by other causes. (But see Harrod, The Trade Cycle, p. 17, for a factor which may tell in the opposite direction)' (Robinson, 1937, p. 94n).
which he had overlooked at the time of writing *The General Theory*.\(^1\) He started by asking himself:

... whether the mistake lies in the approximate identification of marginal cost with price ... For it may be the case that the *practical workings* of the laws of imperfect competition in the modern quasi-competitive system are such that, when output increases and money wages rise, prices rise less than in proportion to the increase in marginal money cost. It is scarcely likely, perhaps, that the narrowing gap could be sufficient to prevent a decline in real wages in a phase in which marginal real cost was increasing rapidly. But it might be sufficient to offset the effect on real wages of a modest rise in marginal real cost, and even to dominate the situation in the event of the marginal real cost curve proving to be almost horizontal over a substantial portion of its relevant length ... this factor would be particularly likely to emerge when output increases, in so far as producers are influenced in their *practical* price policies and in their exploitation of the opportunities given them by the imperfections of competition, by their long-period average cost, and are less attentive than economists to their short-period marginal cost. (Keynes, 1973A, Appendix, pp. 406–7, my italics)

However, Keynes did not like Kalecki's result, as he interpreted it, because his answer to the question of the constancy of real wage depended on the 'coincidence' of the degree of monopoly having exactly the right magnitude as to produce the desired outcome.

V

What difference would it have made to *The General Theory* had Keynes incorporated in it imperfect competition or rather the results obtained by Kahn in *The Economics of the Short Period*? If we compare the two measures of imperfection of the market provided respectively by Kalecki (the degree of monopoly, \(\mu\)) and by Kahn (the coefficient of annihilation, \(q\)) we find that they are formally equivalent.\(^2\) However, they served different purposes. By introducing the imperfection of the market in his dissertation Kahn was able to explain why price does not fall to marginal cost at a low level of demand and why the equilibrium output is less than full capacity. When tackling the issue of what happens if demand is raised in the 'multiplier' article, he argued that prices would be proportional to marginal costs, and output would increase, until full capacity was reached, no particular assumption about the degree of perfection of the market being required for the argument.

Kalecki was not committed to the Marshallian heritage and was more inclined to reject 'unrealistic assumptions' such as perfect competition. Within the framework of imperfect competition, the wage-wage industries, qualifying the basic postulate of diminishing returns? (see the letter of 6 March, 1936; Keynes, 1979, p. 237). Keynes's answer was characteristically defensive: '... in the case of your comments ... [see above], whilst I agree with you, I am not making a change, since it is not possible without rather unsettling the pages, and also because it seems to me that a reader who is really following the drift of the argument cannot very well fail to see what is intended'. See the letter of 11 March, 1936 in Keynes 1979, p. 238.

Recalling that \(q = (p - r)/f\), and that \(\mu = (p - r)/\rho\), it immediately follows that \(\mu = (fp)/p\). This similarity has already been noted by Dardi (1983, p. 18n).
competition he was then led to argue that the degree of imperfection of the market is inversely related to the level of economic activity.

In *The General Theory* Keynes presented a simplified version of the short period: rising marginal cost and a given degree of competition. These assumptions, together with decreasing marginal productivity of labour and profit maximisation, lead to the proposition that there is an inverse relationship between real wages and employment. Therefore, assuming imperfect competition would not, by itself alone, have changed the conclusion. This may explain why Keynes found it difficult to see which of the assumptions made in *The General Theory* lead to a result not supported by the evidence. He wrote to Tarshis, on 10 December, 1938: 'It is clear that I have made a mistake in saying that real wages usually fall when money wages are rising. There are two or three explanations of how I came to make the mistake, and which of them is correct is not very clear to me'.\(^1\)

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\(^1\) JMK papers, file Ej 1/5. Copyright the Provost and Scholars of King's College, Cambridge, 1993. Permission from King's College to quote this unpublished letter is gratefully acknowledged.


