

# Joan Robinson and Economic Theory \*

## 1. Introduction

“When I came up to Cambridge (in October 1921) to read economics, I did not have much idea of what it was about. I had some vague hope that it would help me to understand poverty and how it could be cured. And I hoped that it would offer more scope for rational argument than history (my school subject) as it was taught in those days” (1978a, ix).<sup>1</sup>

Joan Robinson’s approach to economics is reflected in the recollection quoted above. Her interest in the question of the distribution of income and her disdain for what she considered to be theories that tried to justify existing distributions of income never flagged. Her work is marked by a strong inclination for clear, well reasoned arguments that left no room for sloppy habits of thought. It touched many areas in economics, ranging from the theory of imperfect competition to the theory of international trade, and it included reflections on economic philosophy (1963), Marxian economics (1942) and a sketch of an economic interpretation of history (1970). The wide scope and quantity of Robinson’s writings — in addition to many books there are six volumes of collected papers — make it difficult to present a critical evaluation of her contributions within the context of even a lengthy paper. This one will concentrate on her writings in five main areas: (i) the economics of imperfect competition; (ii) the theory of employment; (iii) the theory of

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<sup>1</sup> All references, where only the date is given, are to Robinson’s writings. Page references to articles appearing in the volumes of collected papers will be to the pages in those volumes, but the dates of original publication will be indicated either in the text or in the list of references. Harcourt has informed me that the date given by Robinson for her entry to Cambridge is incorrect; it should be October 1922.

accumulation in the long run; (iv) the concept of capital and the production function; and (v) the problem of time in economics as reflected in her writings on the theme history versus equilibrium.

This separation of Robinson's writings into sections is done for the sake of convenience, rather than in the belief that her contributions to economic theory can be placed in compartments. The problem of time is recognized in all sections, but in some it is set aside so that definite conclusions can be reached, while in others it comes to the fore and the limits it imposes on the possibilities for analytical development are stressed. There is also in each of the first four sections some consideration of factors affecting the distribution of income.

Robinson was a Cambridge economist, and as with all Cambridge economists of her day, the influence of Alfred Marshall should never be overlooked. She wrote that as a student she was repelled by his moralizing and mystified by his "representative firm", but later "I took a more kindly view of Marshall. Though he fudged the problem of time, he was aware of it, and he took pains to avoid the spurious neoclassical methodology. It was Pigou who had flattened him out into stationary equilibrium" (1978a, xi). Cambridge was in many ways a self-contained world that supplied her with theories for criticism and development, and support in arriving at her own formulations. This world included J.M. Keynes and Piero Sraffa whose work provided great stimulation, and Richard Kahn who was a regular collaborator. Nicholas Kaldor arrived later, and discussions with him were important in the working out of an approach to accumulation in the long run. Roy Harrod, although at Oxford, should also be mentioned here, because it was to Keynes and Cambridge that he was sent for his studies in economics. There was a reaching out towards Knut Wicksell during the working out of her model of accumulation, when she was trying to make sense of accumulation within a given state of technical knowledge; however, the most important 'outside' influences on her work are Michal Kalecki and Karl Marx. She took over Kalecki's formulation of the theory of effective demand and the theory of income distribution, while from Marx she derived the concept of a capitalist economic system with its 'rules of the game' (1942).

## 2. The Economics of Imperfect Competition

"... the whole problem of time was fudged. There is no clear distinction in the book between short and long-period relationships or between the future and the past,..." (1978a, x).

Robinson's first major work in economics was *The Economics of Imperfect Competition* published in 1933. The book, together with Chamberlin's *Theory of Monopolistic Competition*, which was also published in that year, were the key works in the 'imperfect competition revolution'. The analytical techniques they developed were to become standard items in text-books on microeconomics. The two books were initially treated as two versions of the same theory, differing mainly in terminology, but there were important differences in the questions treated by the writers. In particular, Chamberlin paid much more attention to the problem of the definition of a determinate demand curve for an individual firm producing a differentiated product than did Robinson. Robinson recognized that for an industry "in conditions of imperfect competition a certain difficulty arises from the fact that the individual demand curve for the product of each of the firms composing it will depend to some extent upon the price policy of the others" (1933, 21). This difficulty was then eliminated by the sweeping assumption that the individual demand curve shows "the full effect upon the sales of that firm which results from any change in the price which it charges, whether it causes a change in the prices charged by the others or not" (*ibid*). Robinson also noted that in treating demand in two-dimensional diagrams, with price on one axis and quantity on the other, an important aspect of time is being overlooked, since the price charged may alter the position of the demand curve in the future. She saw no general and precise way of dealing with this problem and decided that "these complications will be ignored, and we shall assume that it is legitimate to make use of a two-dimensional demand curve, without inquiring how it is drawn up" (*ibid*, 23). There is no recognition of this problem in Chamberlin's book. He treated the current period, for which price and output were determined, as being self-contained for the individual firm, without any acknowledgement of the very special nature of such an assumption for all but perfectly-competitive firms. Short-period profit maximization (the equating of marginal revenue and marginal cost) for a firm in monopolistic competition was identified with profit maximization (e.g. Chamberlin 1948, 193).

The starting point for Robinson's book, as she stated in her Foreword, was Sraffa's 1926 *Economic Journal* article on "The Laws of Return Under Competitive Conditions". He had argued that the majority of firms producing manufactured goods worked under conditions of decreasing costs. The limitations on the firm's sales are set by a negatively-sloped demand curve for that firm's output, with different groups of buyers being, more or less, attached to the products of different firms. Robinson then worked out the consequences of such curves for the determination of price and output with great singleness of purpose. As Shackle stated "the care and thoroughness of her statement of definitions and assumptions, the candour of her declaration about the abstract character of her analysis, the systematic organization which lets us know these things at the beginning and offers a formal explanation and training in the pure technique of average and marginal curves without, at that stage, giving these curves any specific content or interpretation, were at that date something new in economic reasoning" (Shackle 1967, 53).

There are serious flaws in *The Economics of Imperfect Competition* if its purpose is to help explain the determination of prices of manufactured goods. It did not deal with the dynamics of product differentiation, selling costs, oligopoly, the uncertainty faced by firms in ascertaining their demand curves, and the difference between short-period profit maximization and the profit maximization which would be the goal of a self-seeking firm whose interest was in survival and growth. Robinson became well aware of these shortcomings, and in a 1953 paper on "Imperfect Competition' Revisited" she referred to the book as "scholastic" and its assumptions as "by no means a suitable basis for an analysis of the problems of prices, production and distribution which present themselves in reality" (1960, 222). Its greatest weakness is judged to be its "failure to deal with time" (*ibid*, 234). When writing this criticism she felt that no simple generalization could be usefully developed to explain the price policies of firms in manufacturing industries, a position she never really abandoned even though she made use of cost-based pricing in the *Accumulation of Capital*. She developed the notion of "subjective-normal price", whose resemblance to some version of 'full-cost' pricing (of which she had been critical in earlier writings) was noted.<sup>2</sup> This price is obtained by adding a gross margin to

<sup>2</sup> She was probably influenced in this by Kalecki's use of "cost-determined" prices for manufactured goods (KALECKI, 1943 and 1971, 43-61), but she treated her "debt" to Kalecki on a par with her debts to Keynes, Wicksell and Marshall, debts which did not always receive specific acknowledgement (1956, vi).

prime cost "calculated to yield a profit that the entrepreneurs concerned have come to regard as attainable (on the basis of past experience) with the productive capacity in the given short-period situation. Where fluctuations in output are expected and regarded as normal, the subjective-normal price may be calculated upon the basis of an average or standard rate of output, rather than capacity" (1956, 186). Variation in demand relative to productive capacity could lead to actual prices deviating from subjective-normal prices, with prices tending to fall in buyers' markets, and to rise in sellers' markets, where markets are competitive in the short period.

Use of cost-based pricing for analysing manufacturing industries was advocated in the Preface to the second edition of the *Economics of Imperfect Competition*, with more emphasis being placed on the stability of prices relative to costs. "The prices of manufactures in the nature of the case are administered prices. With short-period fluctuations in demand, prices vary little as long as money costs are constant... Movements of demand affect profits strongly, but prices hardly at all" (1969a, vii-viii). But Robinson was always cautious about stating how the net profit component of the mark-up on prime costs was determined. She noted that the influence of demand or "consideration of 'what the traffic will bear'" (*ibid*, vii) could not be ignored.

There are two parts of this book that Robinson still approved of when the Preface to the second edition was written. She felt that the analysis of price discrimination was "still useful", and "what was for me the main point, I succeeded in proving within the framework of the orthodox theory, that it is not true that wages are normally equal to the value of the marginal product of labour" (*ibid*, xii). This "proof" was, however, really a matter of definition, as long as the "orthodox" assumption of a perfectly-elastic supply of labour to the individual firm was maintained. Her analysis showed that in this case the wage in equilibrium would be equal to the value to the firm of the marginal product of labour. "Exploitation" could be shown to have occurred in imperfect competition only if it was defined, as she did, as a situation where the "wage is less than the marginal physical product...valued at the price at which it is being sold" (1933, 283).<sup>3</sup>

<sup>3</sup> Cf. CHAMBERLIN 1948, 177-90.

### 3. The Theory of Employment

"Keynes...brought the argument down from the cloudy realms of timeless equilibrium to here and now, with an irrevocable past, facing an uncertain future" (1971, 89).

"On the plane of theory, the revolution lay in the change from the conception of equilibrium to the conception of history; from the principles of rational choice to the problems of decisions based on guess-work or on convention.... The other half of the Keynesian revolution was to recognize that, in an industrial economy, the level of prices is governed primarily by the level of money-wage rates" (1980, 170 and 173).

Robinson was one of a small group closely involved in the discussions leading up to the writing of the *General Theory*;<sup>4</sup> she was a careful reader of various drafts of this book<sup>5</sup> and an important contributor to the literature that expounded Keynes' theory<sup>6</sup> and that tried to extend its analysis. Initially her writings were closely related to the analytical structure and concepts appearing in the *General Theory*, but she then became more critical of some aspects of Keynes' presentation of his theory. Robinson, as the quotations given above indicate, tended in her later writings to consider her views about the importance of time to be part of the 'message' of the *General Theory*.<sup>7</sup> There is some support for this attitude in Keynes' summary of his theory in the *Quarterly Journal of Economics* in 1937, but Robinson herself did not make this a regular theme in her writings until the nineteen-sixties.

<sup>4</sup> She, along with Richard Kahn, James Meade, Austin Robinson, and Piero Sraffa, were key members of the "Circus", a small group that met regularly during the period January-May 1931. The outcome of their discussions were relayed to Keynes by Kahn, and they influenced the former's subsequent work (KEYNES 1973a, 337-43).

<sup>5</sup> The correspondence between Robinson and Keynes in Volume XIII of Keynes' *Collected Writings*, makes clear her role as a sympathetic, and at times relentless, critic. She felt the need to write in a 1932 letter "You must forgive my rough manners in controversy" (KEYNES 1973a, 378). In commenting on some of the galley proofs of Robinson's *Essays in the Theory of Employment*, Keynes wrote "Your fierceness may quite possibly land you in trouble in some quarters..." (KEYNES 1973b, 147).

<sup>6</sup> Robinson's considerable expository powers were also used in bringing members of her own generation to an acceptance of Keynes' theory. Abba Lerner was one who was influenced by her (1978, xv). She could not help writing to Keynes, after Lerner's review of *The General Theory* in the *International Labour Review* for October 1936 had appeared, "Don't you think Lerner is a credit to me?" (KEYNES 1973b, 148).

<sup>7</sup> She shows herself to be conscious of the problem of time early on in the correspondence preceding the *General Theory*, but just as with the *Economics of Imperfect Competition*, it was left to the side. In a May 1932 letter to Keynes we find: "There is a time element which perhaps cannot be treated on a 3rd dimension. But Time is a common enemy to us all" (KEYNES 1973a, 378).

Keynes' theory is set within a Marshallian short period with given productive capacity.<sup>8</sup> This period was given a historical time dimension by Marshall, "a few months or a year" (Marshall 1920, 379), and Keynes' usage appears to imply implicit acceptance of this approximate time dimension. For Keynes the level of employment depends on the short-term expectations of entrepreneurs about the prices they can get for their outputs and on their short-period supply curves. He assumed that manufactured goods were sold under competitive conditions, and these individual supply curves formed the building blocks for his aggregate supply function (cf. Asimakopulos, 1982). The prices entrepreneurs actually received, the proceeds they realized, depended in his closed economy where government expenditures were ignored, on expenditures for investment and consumption. These realized results could differ from expected results and in so far as these differences led to changes in short-term expectations, there would be, within the short period, changes in the level of employment.<sup>9</sup> Keynes paid scant attention to this process of adjustment of expected to realized results, with the consequent changes in employment and degree of utilization of the given productive capacity. He concentrated on situations of short-period equilibrium where short-term expectations were borne out by events, actual investment was equal to planned investment and consumption was in the desired relation to income. His summary statement of his theory was "...the volume of employment in equilibrium depends on (i) the aggregate supply function... (ii) the propensity to consume... and (iii) the volume of investment... This is the essence of the General Theory of Employment" (Keynes 1936, 29). Keynes argued that there was no reason to expect that, in general, the volume of investment and the propensity to consume would be such that the level of employment they determined would be equal to the full employment level.

The setting out of the relation between saving and investment so that the latter is the prime mover, is an important part of Keynes' theory. Saving must be equal to investment at all times, given the definition of these terms in the *General Theory*, but when this equality is

<sup>8</sup> Robinson made this point very vividly "Keynes hardly ever peered over the edge of the short period to see the effect of investment in making additions to the stocks of productive equipment" (ROBINSON 1978b, 14).

<sup>9</sup> Keynes wrote that "the behaviour of each individual firm in deciding its daily output will be determined by its *short-term expectations*" and in a footnote attached to "daily" he added: "Daily here stands for the shortest interval after which the firm is free to revise its decision as to how much employment to offer. It is, so to speak, the minimum effective unit of economic time" (KEYNES 1936, 47).

part of an equilibrium relation, with saving in the desired relation to income, then Keynes (and Robinson) saw this as a causal relation where investment determines saving through its effect on output. As she wrote in considering an increase in investment: "Investment causes income to be whatever is required to induce people to save at a rate equal to the rate of investment... The argument does not run in the reverse way. The desire to save does not promote investment" (1937b, 10). The first part of this quotation assumes a situation of short-period equilibrium with the multiplier having its full value. But in general it would take time before the full multiplier effects of an increase in investment would be felt, and this did not receive adequate recognition in the *General Theory*. The need for the passage of time was obscured by Keynes with his "logical theory of the multiplier, which holds good continuously, without time lag, at all moments of time" (Keynes 1936, 122). This construct was based on a very special definition of the marginal propensity to consume, *viz.*, the ratio of the increment of consumption at any moment to that moment's increment in income (*ibid.*, 115). Robinson recognized this problem when commenting in 1969 on her 1937 *Introduction to the Theory of Employment*, and noted that implicit in the above quotation from her work was the assumption of negligible time-lags in the response of consumption to income. "The Multiplier represents the change in income *appropriate* to a change in investment. When time-lags are not negligible, the income appropriate to one level of investment cannot, in general, be reached before the level of investment has changed, so that exact equality between the rate of investment and the *appropriate* rate of saving would never be established" (1969b, xiv, italics in the original).

There were two approaches to the determination of the rate of investment in the *General Theory*. One was presented in Chapter 11, and it makes investment dependent on a calculable marginal efficiency of capital and the rate of interest. The second approach was presented in Chapter 12, and it emphasizes the fundamental uncertainty concerning the outcome of investment decisions, which makes all calculations of expected profitability, such as the marginal efficiency of capital, suspect.

"Most, probably, of our decisions to do something positive, the full consequences of which will be drawn out over many days to come, can only be taken as a result of animal spirits — of a spontaneous urge to action rather than inaction, and not as the outcome of a weighted average of quantitative benefits multiplied by quantitative probabilities" (Keynes 1936, 161).

It was this latter approach that Keynes emphasized in his 1937 *Quarterly Journal of Economics* article, and that was the basis of Robinson's approach to investment in her later writings. But initially (for example, in her two books published in 1937) she used the marginal efficiency of capital to explain the determination of investment. Robinson's first published criticism (that I have found) of this approach appears in 1962 in "A Model of Accumulation".

"The formal structure of the *General Theory* embodies the proposition that the rate of investment tends to be such as to equate the marginal efficiency of capital to the rate of interest; this, it must be admitted, was in the nature of a fudge. For a scheme of investment to be undertaken, the profit expected from it must exceed its interest-cost by a considerable margin to cover the risk involved" (1962, 36-37).

In considering Robinson's contribution to the theory of employment it is important not to underestimate the influence on her writings of Kalecki's approach to the theory of effective demand and investment. Robinson incorporated in her work Kalecki's double-sided relation between investment and profits (traces of this are found as early as 1937 in her discussion of the trade cycle in Robinson 1937b). Current investment is an important determinant of the current level of profits, while the latter affects the entrepreneurs' expectations of profits and thus current investment decisions and future investment. She also accepted, as her own, Kalecki's theory of distribution of income in the short period where "the accumulation going on in a particular situation determines the level of profits obtained in it..." (1962, 47).

An area where Robinson's point of view did not change throughout her writings concerned the price implications of full employment in a capitalist economy. In discussing the labour market, she rejected the positively-sloped supply curve of labour which formed part of Keynes' definition of full employment. Although she felt that the elasticity of the supply of labour with respect to real wages "is likely...negative" (1973a, 12), a zero elasticity of supply was assumed in order to simplify the argument. This assumption of an inelastic supply of labour — subject to some minimum real-wage rate at which conditions change drastically (the 'inflation barrier') and an "irresistible demand for higher money wages makes itself felt" (1962, 42) — was to be found throughout her writings. The first of her 1937 *Essays* argued that given the general conditions of the labour market and the degree of union organisation, an increase in effective demand will be favourable to a rise in money wages. Money wages increase, and at an increasing rate, as full employ-

ment is approached. "The general upshot of our argument is that the point of full employment, so far from being an equilibrium resting place, appears to be a precipice over which, once it has reached the edge, the value of money must plunge into a bottomless abyss" (1937a, 24). Robinson judged that fear of inflation, abetted by rising imports in an open economy, would lead banking authorities to limit the increase in the money supply and raise interest rates before full employment is reached.

Robinson had cause to criticize (as in her 1967 review of Le-kachman's book on Keynes) those who implied that the inflationary consequences of high levels of employment "lay outside the scope of Keynes' argument. But the English Keynesians deduced from the General Theory, even while the slump was still with us, that a successful employment policy would lead to a chronic spiral of wages and prices... The incompatibility of continuous full employment with stable prices they saw as the unsolved problem of the future as, indeed, it still is" (1980, 181). Some form of incomes policy appeared to her to be a necessary complement to a full employment policy, with the trade union movement accepting social changes and a say in the 'type' of output to be produced<sup>10</sup> in lieu of the rapid, but in the end futile increases in money wages that their enhanced bargaining power could bring. She did not, however, specify how she saw such a policy being developed and implemented.

Robinson's attack on equilibrium theories, as in her 1953-54 paper on the production function and the theory of capital (1960, 114-31), was initially directed to those concerned with long-period equilibrium, but short-period equilibrium did not escape her criticism in later writings. In some of these she even appeared to deny the short period the historical time dimension to be found in Marshall and Keynes, as well as in her earlier works. *Economic Heresies*, published in 1971, can be taken to mark the changeover. She begins her chapter on the short period with praise for "an invaluable concept, which sharply distinguishes the Marshallian school of thought from the tradition of Walras — that is, the 'short period' during which the stock of capital is unchanged while its utilization can be varied" (1971, 16). This parallels her treatment in the *Accumulation of Capital* where "the *short period* in the analytical

sense, is not any definite period of time, but a convenient theoretical abstraction meaning a period within which changes in the stock of capital equipment can be neglected. Within a short period the rate of output can alter, for it is possible to utilise given equipment more or less by employing more or less labour to operate it" (1956, 179, italics in original). Although she does not attach a definite length to the short period here, it clearly encompasses some interval of time because it is long enough to enable decisions to be made and carried out to change the degree of utilisation of the relatively unchanged productive capacity. In *Economic Heresies* the short period appears to lose its substance: "Marshall's short period is a moment in a stream of time... It is better to use the expressions 'short period' and 'long period' as adjectives, not as substantives. The 'short period' is not a length of time but a state of affairs" (1971, 17-8). This is echoed in later writings, for example, "A short period is not a length of time but the position at a moment of time" (1978b, 13). With this approach she takes away the setting for Keynes' theory since there is no time available to permit variations in the utilisation of productive capacity in response to changing short-term expectations.

Robinson is thus going beyond a criticism of the automatic use of short-period equilibrium, and of the implicit assumption that there is a reliable and not very time-consuming process of adjustment to such an equilibrium. The logic of her position, if an attempt is made to include Keynes' analysis within its scope, requires a very special definition of 'equilibrium'. "A state of expectations, controlling a given level of effective demand, is given only momentarily and is always in the course of bringing itself to an end. Perhaps it was a misnomer to describe such a position as equilibrium, but without a concept of the character of an existing short-period situation it is not possible to say anything at all" (*ibid*). There is no indication in Keynes' analysis, or in Robinson's earlier writings, that the term "equilibrium" in the theory of effective demand has this very special meaning. A particular set of short-term expectations might be "given only momentarily" (or "daily") but there is sufficient time in Keynes' short-period for changes in these expectations in response to the experience of actual results. Output and employment would be adjusted within the short period, to the extent that it can be usefully done, given the changing short-term expectations and the fixed productive capacity. A situation of short-period equilibrium would be a very special case, which might be of interest for analytical purposes to show the difference in results obtained with Keynes' model, as opposed

<sup>10</sup> Robinson called the issues concerned with the *content* of employment "The Second Crisis of Economic Theory" (the first crisis concerned the Depression of the 'thirties) (ROBINSON 1973, 92-105).

to those to be deduced from the "classical" model. That is, for Keynes a situation of less than full employment is not necessarily the result of short-run disequilibrium (cf. Kregel 1976, 213).

Finally, mention should be made of Robinson's paper on "The Long-period Theory of Employment" that was included in the 1937 *Essays*,<sup>11</sup> because it indicates how her later criticisms of equilibrium were directed at an approach that was reflected in her own work.<sup>12</sup> Robinson dealt with the special case of static conditions where the level of long-period employment resulting from an unchanging state of long-term expectations, was constant. Twenty years were to pass before she was to publish a major work, *The Accumulation of Capital*, that moved her long-period analysis from static conditions to changing conditions.

#### 4. The Accumulation of Capital

"Everything that happens in an economy happens in a short-period situation, and every decision that is taken is taken in a short-period situation, for an event occurs or a decision is taken at a particular time, and at any moment the physical stock of capital is what it is; but what happens has a long-period as well as a short-period aspect... Short-period decisions affect the utilisation of given equipment... long-period decisions affect the stock of productive capacity" (1956, 180).

"The short-period situation in existence to-day is like a geological fault; past and future developments are out of alignment. Only in the imagined conditions of a golden age do the strata run horizontally from yesterday to to-morrow without a break at to-day" (*ibid.*, 181).

*The Accumulation of Capital* must be given an important place in any consideration of Robinson's writings on economic theory.<sup>13</sup> This is the work of a mature scholar that is centered around the analysis of the long-run development of a capitalist economy,

<sup>11</sup> KREGEL (1983, 343n) notes that Robinson's work on this concept arose out of her comments on page proofs of *The General Theory*, and concludes that this article, originally published in *Zeitschrift für Nationalökonomie* in 1936, was probably completed before publication of *The General Theory*.

<sup>12</sup> She noted in the first footnote of this paper: "The conception of equilibrium employed in this essay is the Marshallian conception of a position of rest towards which the system is tending at any moment" (ROBINSON, 1937a, 106n).

<sup>13</sup> HARROD's writings on dynamic economics (1939, 1948) were important sources of stimulation for her, since both were working from a Marshallian as well as a Keynesian background (1956, vi).

and that touches on many aspects of economic theory. It is planned on a broad scale that combines statements full of insights on the purpose and scope of economic theory and the meaning of equilibrium, with a detailed and careful analysis of accumulation in the long run, the choice of technique, the evaluation of capital, and technical progress. She also devotes space to a consideration of the short period, the role of finance, the determination of relative prices, and international trade. The book concludes with a series of notes on various topics that include welfare economics, the neoclassical theory of wages and profits, Wicksell on capital, the natural rate of interest, and the quantity theory of money. Many of the issues she raises in this book continued to appear in various forms in her later writings, such as the difference between analyses concerned with comparisons and those with changes. "Throughout the argument it is necessary to distinguish *differences* from *changes*. The effect of having had in the past, and continuing to have, say, a higher rate of accumulation or a higher degree of monopoly, is not the same as the effect of a rise in the rate of accumulation or of an increase in monopoly" (*ibid.*, 71, italics in the original).<sup>14</sup>

*The Accumulation of Capital* is a valuable book — one which repays the student's effort to work through it with care — and yet it fails in its attempt to provide "an extension of Keynes's short-period analysis to long-run development" (*ibid.*, vi), since the assumptions she makes in order to develop the theory represent a 'watering down' and even a denial, of what she considered to be essential elements of Keynes' theory. It may very well be that any such ambitious attempt is doomed to failure because no more than an indication of some possible lines of long-run development can be obtained if the essentials of Keynes' analysis are to be retained. A few years after the publication of this book she published a set of essays "as an introduction... to my *Accumulation of Capital*" (1962, v), essays that showed her growing concern with the unsuitability of equilibrium concepts. These essays did not, however, avoid at critical points the contradictions between her views on the limitations of equilibrium, and her use of equilibrium in the presentation of her theory of economic growth.

There is in Robinson's treatment of accumulation the same characteristic boldness in the development of the analysis, that is to be

<sup>14</sup> This point, which underlies much of her later writings (see section 6), was one of the three methodological rules to which she drew attention in her *Exercises in Economic Analysis*. The other two rules mentioned are: "A quantity has no meaning unless we can specify the units in which it is measured" and "Technical and physical relations, between man and nature, must be distinguished from social relations between man and man" (1960b, v).



found in the *Economics of Imperfect Competition*. She places at the core of her section on 'Accumulation in the Long Run' ("the central part of the work" (*ibid*, ix)) the assumption of tranquillity — the development of the economy "in a smooth and regular manner" — that eliminates uncertainty. "In order to separate long-run from short-run influences it is a useful device to imagine an economy developing in conditions of tranquillity, and to postulate that the expectations about the future, held at any moment, are in fact being fulfilled. This yields results equivalent to assuming correct foresight..." (*ibid*, 66). This makes it possible to deal with accumulation as part of an equilibrium story of steady growth. Entrepreneurs' long-term expectations — and thus the investment decisions based on them — turn out to be justified by events. Robinson follows Kalecki in assuming all wages are spent, and in her main model there is only workers' consumption since rentiers are excluded and the consumption of entrepreneurs, "whose sole function and aim is to organize production and accumulate capital" (*ibid* 73), is negligible. Profits must thus be equal to investment.

Accumulation, determined "by the energy with which entrepreneurs carry it out" (*ibid*, 84), can proceed at a steady rate as long as there is sufficient labour available at the real-wage rate permitted by technology and this equilibrium growth rate. There is an inverse relation between the real-wage rate and the rate of accumulation (and thus the rate of profit), given the technique of production. Robinson brings this out by comparing different economies, with the same technique of production, but with different histories of steady growth. The economy with the higher rate of accumulation has the lower real-wage rate.<sup>15</sup> If the two economies have the same money-wage rate, then the price of consumption goods is higher in the economy with the higher rate of accumulation since there are relatively more workers employed in the investment sector competing for consumption goods. Robinson assumes that an 'inflation barrier' triggered by an irresistible demand for higher money wages when real-wage rates are reduced to some minimum acceptable level<sup>16</sup> by rising investment and prices, limits the possible rate of investment in any situation. Within that limit the rate of accu-

mulation (and thus the rate of profit) depends on the energy of entrepreneurs. Accumulation can proceed steadily with constant technique as long as the increasing amount of labour required to man the increasing productive capacity is available.

Technical progress is restricted in Robinson's model to changes in the methods of production, since the composition of the basket of consumption goods is assumed to remain unchanged through time. It can be introduced into the model without violating the conditions for steady growth, as long as output per head increases at the same rate in both consumption and investment sectors.<sup>17</sup> This type of technical progress is equivalent to Harrod's neutral technical progress, when accumulation is such as to keep the rate of profit constant. The real-wage rate in this case will increase at the same rate as output per head, and thus the division of the labour force between the two sectors and income shares will be unchanged.

The economic system has difficulty in adapting to changes in the rate of technical progress, as well as to "biased" changes since they destroy "tranquillity". Variations in the pace of technical progress disrupt equilibrium because they alter the rates of obsolescence of existing equipment from what firms had expected them to be on the basis of past experience. Technical progress is said to have a *capital-using bias* if output per man in the consumption sector increases at a faster rate than it does in the investment sector. It has a *capital-saving bias* if this increase in the investment sector is greater than it is in the consumption sector. If accumulation has been proceeding at a steady rate, then the introduction of capital-using technical progress means that productive capacity in the consumption sector is increased by less than output per man, thus leading to a fall in employment in that sector. Adjustment to such a change that maintains the level of employment (or its rate of growth) requires an increase in the rate of accumulation (and thus an increase in the rate of profit) with employment in the investment sector increasing relative to employment in the consumption sector. The real-wage rate would increase in this case by less than the increase in output per man in the consumption sector. Conversely, with capital-saving technical progress and a constant rate of accumulation, productive capacity in the consumption sector is growing faster than output per man. If it is to be fully utilized, employment must be increased in that

<sup>15</sup> Caution must be exercised in drawing conclusions from these comparisons. Entrepreneurial "energy" determines not only the rate of accumulation, but also the rate and nature of technical progress, and thus the comparison of economies with different rates of accumulation "in the same phase of technical development" (1956, 90) is very special.

<sup>16</sup> Within the spirit of the model, especially under conditions of oligopoly with fixed mark-ups, the "inflation barrier" would be triggered by a fall in labour share in total output. Robinson, however, always refers to some minimum "level" rather than to a minimum "share".

<sup>17</sup> The equipment produced by the investment sector would tend to change with technical progress, but the measure of output in that sector is the productive capacity of the plant produced for the consumption sector where the type of output is unchanged over time.



sector relative to employment in the investment sector. Adjustment to capital-saving technical progress thus requires a falling rate of investment (and rate of profit) and an increase in real-wage rates that is greater than the increase in output per man in the consumption sector.

A situation where technical progress is neutral and proceeding steadily, with normal productive capacity being utilized and growing at a rate sufficient to employ the available labour force, with the rate of profit constant and the real-wage rate rising with output per man, is described "as a *golden age* (thus indicating that it represents a mythical state of affairs not likely to obtain in any actual economy)" (*ibid*, 99). This corresponds, as Robinson notes, to an equality between Harrod's *actual, warranted* and *natural* rates of growth. In her later *A Model of Accumulation* (1962, 22-87) she used the term "*desired* rate of accumulation" to describe a situation corresponding to Harrod's warranted rate of growth where entrepreneurial investment decisions are justified by events; but in which there may be unemployment. In Robinson's work the possible differences between the warranted (or desired) and natural rates are less marked than in Harrod's because the rate of technical progress is not given independently of entrepreneurial energy and pressures exerted by rising wage rates:

"My model is intended to show that when the urge to accumulate ('animal spirits') is high relatively to the growth of the labour force, technical progress has a tendency to raise the 'natural' rate of growth to make room for it, so that near-enough steady growth, with near-enough full employment may be realized (though even then uncertainty may give rise to short-run instability). In the converse case, the existence of a growing surplus of labour, though it may slow down technical progress, cannot be relied upon to bring the 'natural' rate of growth down to equality with the sluggish rate of accumulation" (1965, 50-1).

There is also an important difference in the assumptions about the number of possible equilibrium rates of profit in a particular economy since they affect the possible values for the average propensity to save in the economy, given the propensities to save out of wages and profits. For Harrod as well as Robinson, the propensity to save out of profits is greater than the propensity to save out of wages, but in his model there is only one possible warranted growth path, given technology and these propensities, because there is only one possible equilibrium distribution of income.<sup>18</sup> As we see above, the equilibrium rate of profits in

Robinson's model, and thus the average propensity to save, depends (within the limits set by the inflation barrier) on the dynamism of the entrepreneurs.

Robinson made great efforts, and showed considerable ingenuity, in order to examine the choice of technique when the state of knowledge makes available a variety of methods that are feasible (that is, each of which may be the most profitable at some hypothetical real-wage rate). This involved the comparison of equilibrium positions at different real-wage rates and the general rule was that the higher the real-wage rate, the greater the degree of mechanisation of the technique chosen (as indicated by net output per unit of labour). Robinson recognized that there could be exceptions to this rule, since the rate of profit enters into the cost of capital goods. With a higher real-wage rate (and consequently lower rate of profit) the cost of capital for a less mechanised technique may decrease relative to the cost for a more mechanised technique. This decrease may be sufficient to make the former more profitable. The possible reversal of the expected result<sup>19</sup> was labelled 'A Curiosum' and its exposition was described as "a somewhat intricate piece of analysis which is not of great importance" (1956, 109n.). It did, however, assume considerable importance in the subsequent "Cambridge Controversies in the Theory of Capital", since the "backward switch" whose possibility she demonstrated, is a requirement for reswitching (Harcourt 1972).

Equilibrium growth paths are clearly very special within the general framework of Keynesian theory, but their elaboration in the central part of *The Accumulation of Capital*, with reservations more in the nature of anecdotal comments, gives them undue importance. Robinson also tends to neutralize the effects of changing conditions, with equilibrium adjustments to them being made to seem plausible, by conducting the analysis of accumulation in the long run "on the assumption that at every moment entrepreneurs expect the future rate of profit obtainable on investment to continue indefinitely at the level ruling at that moment; that they expect the rate of technical progress (which may be nil) to be steady; and that they fix amortisation allowances for long-lived plant accordingly. *When something occurs*

equilibrium, consistent with other dynamic determinants, there must be more than one equilibrium growth rate. I would not deny that a multiplicity of equilibrium profit shares and profit rates is a possibility; but it seems to me unlikely" (HARROD 1970, 738).

<sup>19</sup> ROBINSON noted that for this possibility "I had picked up the clue from Piero Sraffa's Preface to Ricardo's *Principles*..." (1973, 145).

<sup>18</sup> In replying to a comment by Robinson on his model, Harrod wrote: "I agree with Professor Robinson that, if there is more than one possible equilibrium profit share in a dynamic

which causes a change, we assume that expectations are immediately adjusted, and that no further change is expected" (1956, 67, italics supplied). It is only in a later section (clearly not the "central part of the work") that uncertainty is introduced.

There is an improvement in presentation in "A Model of Accumulation", since Robinson begins the analysis in a particular short period and deals first with short-period equilibrium before introducing some of the possible equilibrium growth paths. Situations that are described as, for example, a "Limping Golden Age", a "Leaden Age", a "Bastard Golden Age", and a "Galloping Platinum Age", are presented as a partial catalogue of possible growth paths. The weak point in this impressive essay is the method used to show the movement from a given short-period situation to the long-period equilibrium of the *desired* rate of accumulation. Both this "movement" and the introduction of the rate of profit into a short-period situation are based on the question-begging assumptions of her earlier book on the formation of expectations when changes are occurring. The expected rate of return on investment is assumed to be "estimated on the basis of current prices" (1962, 47) and this rate is then used to derive a value for the existing stock of capital, since it is assumed that it can provide a stream of net profits at the current level indefinitely.<sup>20</sup> This value is then used to turn the actual and planned rates of investment into rates of accumulation.

Entrepreneurs expect "tomorrow" to be like "today", even though their expectations keep being disappointed, until the "desired" rate of accumulation, where the expected and the actual rates of profit are the same, is achieved. The diagram (1962, 48) she presents to illustrate the double-sided relationship between the rate of profit and the rate of accumulation, is inappropriate according to her own methodological position, since outside of long-period equilibrium the rate of profit does not have any clear meaning (Asimakopulos 1976, 382). There is even a characterization of the stability of the equilibrium positions given by the two points of intersection of the two curves in her diagram. But as Robinson stated in the introductory section of this essay, when expectations are liable to be falsified, as they are at all points other than at

the intersection points in that diagram, "the out-of-equilibrium position is off the page..." (1962, 25).

Another feature of the analysis that is at variance with her general position is the assumption of competition (in the short-period sense) in the consumption-good sector when she is considering short-period equilibrium. This assumption is thus implicitly made for all the growth paths she discusses subsequently, since they take as given the existence of short-period equilibrium. The assumption of short-period competition ensures the production of normal capacity output even when effective demand is weak (prices are then low relative to money wages), with employment in the consumption-good sector being "more or less closely determined by the available plant" (1962, 47). It would have been more in keeping with her view on the oligopolistic nature of manufacturing industry (see section 2 above) to have assumed fixed rather than variable mark-ups in the face of variations in effective demand.<sup>21</sup>

Robinson's presentation of her model of accumulation in the long run is thus not always consistent with her general views on economic theory, and students may be misled by certain sections. Another example of this is her introduction of the possibility of the rate of interest being equal to the rate of profit, even though elsewhere she makes clear that the distinction between the two is important (see, for example, 1971, 30). A possible reason for this may be the way she built up the analysis, with rentiers excluded from the main model in Book II of *The Accumulation of Capital*, and thus there is only one type of capital income in that model.

These lapses from the very high standards Robinson set for herself do not detract from the important contributions of her two major works on accumulation. They make clear the possible effects on the rates of accumulation of differences in the degree of thriftiness, the extent of competition, the organisation and attitude of labour, rates of technical progress, and entrepreneurial energy, and thus they indicate features of some of the possible growth paths. Robinson clearly recognized the limits on the ability of economic theory to explain any actual rate of accumulation, since the complex factors at work cannot be captured by any investment function. "We must be content with the conclusion that,

<sup>20</sup> A telling criticism of this approach is to be found in Robinson's writings. "In reality, to find the expected rate of return which governs investment decisions is like the famous difficulty of looking in a dark room for a black cat that probably is not there, and to give a true account of realised returns is like the famous difficulty of the chameleon on a plaid rug" (1956, 192).

<sup>21</sup> ASIMAKOPOULOS (1970) has worked out her model on the basis of mark-up pricing.

over the long run, the rate of accumulation is likely to be whatever it is likely to be" (1956, 244). Her position is thus similar to Kalecki's "the rate of growth at a given time is a phenomenon rooted in past economic, social and technological developments rather than determined fully by the coefficients of our equations..." (Kalecki 1971, 183).

## 5. Capital and the Production Function

"The real dispute is not about the *measurement* of capital but about the *meaning* of capital" (1975b, vi, italics in original).

Robinson's investigation of the theory of capital and the production function can be seen as initially having a constructive as well as a critical purpose. Its constructive purpose was to find acceptable ways of dealing with the process of accumulation, given the state of technical knowledge, a process that leads to a "deepening" of the capital stock. Its critical purpose was to expose the inadequate theoretical foundations for the neoclassical production function that has capital as one of its factors of production. She later repudiated the analysis of accumulation within a given state of technical knowledge (1975c, 34), but she held firmly to her criticisms of the neoclassical theory of capital and distribution.

Robinson's definitive statement of accumulation and the production function is probably to be found in a 1959 *Economic Journal* article with the title "Accumulation and the Production Function" (reprinted in 1960a, 132-44). An important difference between this attempt to deal with this problem and that found in *The Accumulation of Capital* is that she no longer attempts to provide any plausibility to an equilibrium growth path. "But why try to make it seem plausible, when we know that in real life nothing like it ever happens? Let us take it simply as an exercise, and postulate that accumulation does take place in this way for no other reason than that is what we choose to postulate" (*ibid*, 133). In this exercise she examines the neoclassical problem of accumulation occurring in an economy where both the labour force and the state of technical knowledge are unchanged. This accumulation results in a falling rate of profit and a rising real-wage rate. Robinson makes use of the adjective "Keynesian" for the manner in which she investigates this neoclassical problem, but "Kaleckian" would be more appropriate, since the theory of distribution she uses is Kalecki's.

The very special nature of this exercise is made clear by her language. "The Keynesian freedom of entrepreneurs to invest as they please has...been sacrificed...to the postulate that equilibrium is never ruptured" (*ibid*, 134). In this state of equilibrium, the value of capital per unit of labour is continuously rising, while the movement of income shares depends on the relation between real wages and output per head. Accumulation in this economy generally increases both of these, with constant relative shares being observed "when the rise in output per head happens to be exactly proportional to the rise in wages associated with it, the ratio of investment to income is constant and consumption is increasing at the same rate as total net income" (*ibid*, 139). A situation where a small rise in real wages leads to the adoption of a more mechanized technique with a much higher value of output per man, will cause the share of profits to rise under equilibrium conditions. Conversely, when a substantial rise in wages results in the adoption of a technique with only a slightly higher output per head, then the share of wages would increase under equilibrium conditions. Robinson identifies the first case as one of high substitutability of capital for labour, and the second with very low substitutability. She concludes: "Thus, broadly speaking, easy substitutability causes the share of profits to rise as capital accumulates, and sticky technical relations cause the share of wages to rise" (*ibid*, 140). (It should be emphasized again that technical progress is kept out of this exercise. Its introduction could alter the equilibrium relation between accumulation, the rising degree of mechanization and the falling rate of profit.)

The opening shot in Robinson's attack on the use of capital in the neoclassical production function was made in her 1953 article "The Production Function and the Theory of Capital" (reprinted in 1960a, 114-29). She asked the critical question, if  $C$  is the quantity of capital that appears in a production function "in what units is  $C$  measured"? (*ibid*, 114). It is not a question that neoclassical theorists have been able to answer satisfactorily. In the short period, capital can be taken to stand for the specific list of all the goods in existence at that point in time, but then it is possible to regard labour "as the sole factor of production, operating in a given environment of technique, natural resources, capital equipment and effective demand" (Keynes 1936, 214). The neoclassical approach can thus not find any support in a short-period situation, but it also faces problems when confined to long-period equilibrium situations, since the measure of the quantity of capital (a value) is *not* independent of the rate of profit. This point was

recognized in Robinson's 1953 paper, but its expression became much sharper after the 1960 publication of Sraffa's *Production of Commodities by Means of Commodities*. In her 1961 review of that book Robinson emphasized that what Sraffa "demonstrates decisively...is that there is no such thing as a "quantity of capital" which exists independently of the rate of profit" (1965, 13). This means "that the contention that the 'marginal product of capital' determines the rate of profit is meaningless" (1973, 144).

Robinson, and others, made use of the concept of a "pseudo-production function" in the "re-switching" controversy (Samuelson, 1966). This function is based on the idea of "a book of blueprints specifying all possible techniques for producing a flow of net output of a given composition with a given labour force" (1978a, 121). The techniques have different net outputs per unit of labour, and the rates of profit they allow can be determined once the share of wages in net output is given. For each share the technique (or techniques) that provide the highest rate of profit can be said to be included in the pseudo-production function at that wage share (or for the corresponding rate of profit). This function may be represented diagrammatically by the wage-rate of profit frontier. For each technique there is an inverse relation between the wage share and the rate of profit, which can be represented by a wage-rate of profit curve, and it is the envelope of the set of all such curves for the techniques covered by the "book of blueprints" that is called the wage-rate of profit frontier. Each technique (assuming inferior techniques have been eliminated) provides a point (or points) to the frontier corresponding to the wage share (or shares) at which it allows the highest rate of profit. A technique providing the highest rate of profit (given the wage share) can be said to be "eligible" at that rate of profit. Each point on this frontier represents a steady-state growth path in which the corresponding technique is reflected in the who's who of capital goods, and where the rate of profit, the expectation of which led to this choice to technique, is being realised. There may be stretches on this frontier where only a single technique is eligible and others where many techniques are to be found. A particular technique may appear at one point on the frontier and then re-appear on another section (this is what is meant by "re-switching"). When adjacent points on the frontier are compared, there is no necessary inverse relation between the values of net output per man of the techniques they represent, and the rates of profit at which they are eligible. (There could also be substantial differences in the types of

capital goods that are employed by these adjacent techniques.) The more mechanised technique may be eligible at a higher rate of profit. It is this possibility, due to the impossibility of valuing capital independently of the rate of profit, that undermines the foundations of the neoclassical approach to capital and the production function.

The pseudo-production function is obviously a very artificial construct, which Robinson was only prepared to use for the sole purpose of making a critique of neoclassical theory. It involves the comparison of isolated economies, each of which is in long-period equilibrium, but some of the other economists using it left the impression that one could move from one point on this function to another. Robinson's continuing emphasis on the fundamental difference between analyses dealing with comparisons and those dealing with changes, as well as her appreciation of the very special nature of long-period equilibrium, were the main features in her writings of the last several years of her life, and it is to these that we now turn.

## 6. Time and Equilibrium

"As soon as the uncertainty of the expectations that guide economic behaviour is admitted, equilibrium drops out of the argument and history takes its place" (1974, 48).

Long-period equilibrium positions can be defined on the basis of given technical conditions of production, the state of competition, tastes, and incomes. They describe situations in which all market participants are in their chosen positions, given the values of the parameters. Producers have the capital equipment they would choose to have under current circumstances, and their plants are being operated at normal productive capacity, with prices being such as to provide a normal rate of profit on the values of their investments. Robinson's growing distrust of analyses that use these positions as "centres of attraction" for the actual values in an economy led to disputes with some of those who were her allies in the "capital controversies". The direction of Robinson's thinking was indicated in her 1953 article on the production function and the theory of capital, where she was critical of the neoclassical view of a long-period equilibrium position as one

towards which the economy is tending to move as time goes by.<sup>22</sup> This view is critically dependent on the assumption of stationary conditions, whose very special nature for anyone concerned with analysing actual events had been pointed out by Marshall.

“But in real life...the demand and supply schedules do not in practice remain unchanged for a long time together, but are constantly being changed; and every change in them alters the equilibrium amount and the equilibrium price, and thus gives new position to the centres about which the amount and the price tend to oscillate.

These considerations point to the great importance of the element of time in relation to demand and supply...the normal, or ‘natural’, value of a commodity is that which economic forces tend to bring about *in the long run*. It is the average value which economic forces would bring about if the general conditions of life were stationary for a run of time long enough to enable them all to work out their full effect.

But we cannot foresee the future perfectly. The unexpected may happen; and the existing tendencies may be modified before they have had time to accomplish what appears now to be their full and complete work. The fact that the general conditions of life are not stationary is the source of many of the difficulties that are met with in applying economic doctrines to practical problems” (Marshall 1920, 346-7, italics in original).

Robinson believed that entrepreneurs’ expectations which guide their investment decisions in a world where future conditions can only be guessed at, are not focussed on anything that can be covered by the term “long-period equilibrium” values. She sometimes expressed her position on this point by distinguishing between “logical time” and “historical time”. What may have been her first published statement of this position is to be found in the introduction to the 1962 *A Model of Accumulation*. Consider a model that consists of a set of equations, sufficient in number to determine the equilibrium values of its variables. These equations may determine a path through time for these values, “but the time through which such a model moves is, so to speak, logical time, not historical time” (1962, 23-4), since nothing is allowed into the model that may disturb equilibrium. Robinson gives as an example of such a model her own exercise on accumulation and the production function referred to in the preceding section. It was assumed there, for the sake of the exercise, that entrepreneurial expectations were always

<sup>22</sup> The timeless nature of long-period equilibrium is vividly conveyed by ROBINSON’S statement: “Long-period equilibrium is not at some date in the future; it is an imaginary state of affairs in which there are no incompatibilities in the existing situation, here and now” (1965, 101).

borne out by events as accumulation proceeded in a constant state of knowledge and with a constant labour force. The disturbances and miscalculations that occur in any actual economy are ruled out by the self-contained world of the system of equations. The nature of the equilibrium path between any two points of time can be inferred by projecting “forward” from its values in “earlier” periods of time, or by projecting “backward” from its values in “later” periods of time. The fundamental difference between the past and future of historical time disappears since all aspects of the “future” are foreordained by the “past”, and *vice-versa*. There is no sense to the question of the “stability” of such an equilibrium path. If an actual position were not on the path, then the equilibrium equations would not apply, and a tougher kind of model that allows for uncertainty and the disappointment of expectations must be used.

A model set in historical time will normally not be in equilibrium. “To construct such a model we specify the technical conditions obtaining in an economy and the behaviour reactions of its inhabitants, and then, so to say, dump it down in a particular situation at a particular date in historic time and work out what will happen next. The initial position contains, as well as physical data, the state of expectations of the characters concerned (whether based on past experience or on traditional beliefs). The system may be going to work itself out so as to fulfil them or so as to disappoint them” (1962, 25-6). This type of model does not furnish the wide range of precise results readily provided by equilibrium models, but this relative paucity is a reflection of the limits of economic theory as a guide to the intricacies of economic events. Only within the context of such a model, which of necessity must be “loose-jointed” (1960, 27) can the effects of changes, with the resultant disappointment of expectations, be analyzed. All that equilibrium models can provide are comparisons of equilibrium positions.

Robinson’s rejection of equilibrium models as guides to the understanding of actual events is also reflected in her view of the “unimportance of reswitching” (1975c). The discussion of this phenomenon was carried out using a pseudo-production function, and as we saw in the preceding section, this function is built up from the comparison of different economies experiencing steady-state growth. They all share the same technical knowledge, but they differ in the rates of accumulation and propensities to save. The whole purpose for Robinson of such a construct was a negative one, to show that the concept of the marginal productivity of capital has no meaning. With

that established she wants to leave behind models that give an important place to positions of long-period equilibrium in order to come to grips with a process of accumulation going on through time. "There is no such phenomenon in real life as accumulation taking place in a given state of technical knowledge" (1975c, 39).

Finally, it should be noted that Robinson's emphasis on the essentially "negative" importance of Sraffa's *Production of Commodities by Means of Commodities*<sup>23</sup> has led to differences with those economists, such as Garegnani (1976, 1979), who want to build theoretical analyses on the basis of Sraffa's model. Her position reflects extreme caution about the possible significance of anything that might give precision to long-period concepts (1979b).

## 7. Conclusion

Robinson was a Cambridge economist whose work falls within the Marshallian tradition. Her writings, such as those on imperfect competition, the theory of employment, and the accumulation of capital were motivated by a desire to extend economic theory. The high quality of her contributions was recognized by the economics profession as witnessed, for example, by the inclusion of her articles in the series of readings sponsored by the American Economic Association.<sup>24</sup> But she will probably be remembered best as a critic of the present-day drift of much of economic theory towards an excessive formalism which leaves out essential elements of economic reality. Her strong grasp of economic theory and deep understanding of how it can be constructed and manipulated, sometimes led her to note "that the Emperor had no clothes" (1974a, vi). Careful study of her writings will richly repay

<sup>23</sup> A change in her position can be discerned by comparing the 1961 review of this book (1965, 7-14), and the 1975c and 1979a papers. In the review she was prepared to use the model to consider the effects of changes on the wage share, although even then she noted the very special nature of the term "change" when used in connection with that model. In the later paper it is made clear that "there is no movement from one position to another, merely a comparison of positions corresponding to different levels of the rate of profit..." (1979a, 5).

<sup>24</sup> Two papers, "The Foreign Exchanges", and "Beggars-My-Neighbour Remedies for Unemployment", appeared in *Readings in the Theory of International Trade* (1950). "The Classification of Inventions" was reprinted in *Readings in the Theory of Income Distribution* (1951), and the "Rising Supply Price" was included in *Readings in Price Theory* (1952).

students for the time and effort devoted to them. There is as well the special quality of the person which is difficult to convey. Brus and Kowalik recall that the first time they met Robinson was at an official function for a group of visiting economists in Poland the day after the events of June 1956, when workers in Gdansk and Poznan had risen up against the authorities and provoked bloody reprisals. The atmosphere was heavy with unexpressed thoughts about the events, but only vacuous comments about the value of exchanges of views were being made — Robinson could not let things stand without stating the need to find out what had happened and why. "Until that time we had thought of Joan Robinson as a left Keynesian bent on confronting Marxism with difficult questions. But at that moment she acquired a moral authority which she retained all her life. Joan Robinson was a person who awakened conscience and asked questions which disturbed complacency whether it be the complacency of academic or of Marxist orthodoxy" (Brus and Kowalik, 1983, 244).

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