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DISCUSSION PAPERS IN ECONOMICS

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SRAFFA, SRAFFA CRITICISES KEYNES, AND PRESENT-DAY  
COMMENTATORS GET HOLD OF THE WRONG END OF THE  
STICK**

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**No 13-19**

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# An issue with own-rates: Keynes borrows from Sraffa , Sraffa criticises Keynes, and present-day commentators get hold of the wrong end of the stick

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## Abstract

Scholars who in recent years have studied the Sraffa papers held in the Wren Library of Trinity College, Cambridge, have concluded from Sraffa's critical (but unpublished) observations on Chapter 17 of Keynes's *General Theory* that he rejected Keynes's central proposition that the rate of interest on money may come to 'rule the roost', thus dragging the economy into recession. While Sraffa does indeed express dissatisfaction with Chapter 17, the commentators have, we believe, misunderstood his concern: we suggest that he was unhappy with the 'own-rates' *terminology* employed by Keynes rather than with the *substance* of the theory developed in Chapter 17.

JEL Classifications: B22, B31, E12, E43

Key words: Chapter 17 of Keynes's *General Theory*,  
commodity-rates, own-rates of interest

## Introduction

Since the papers of the late Piero Sraffa have become available to scholars, that most intriguing and important chapter of Keynes's *General Theory*, Chapter 17 on 'The Essential Properties of Interest and Money', has again come under critical fire, notably from Ranchetti (2002) and Kurz (2010, 2012). Oka (2010) tries to fend off the criticism. The contention of these critics, deriving from their study of the Sraffa papers, is that Keynes, having adopted Sraffa's concept of commodity or own-rates, failed to make proper use of it, and (as long ago perceived by Sraffa himself, but recorded only in unpublished notes) fell into serious error, error calling into question a key proposition of his theory.<sup>2</sup>

Two issues regarding Keynes's use of Sraffa's 'commodity-rates' (or 'own-rates' as Keynes preferred to call them) have arisen. (i) Keynes famously argued that in conditions of developing recession a relatively sticky 'own-rate' on money would come to 'rule the roost', knocking out investment in other assets, the falling returns on which could not compete with the return on money. Sraffa, it has been discovered, noted privately that, with deflation, the own-rate on money would – in apparent contradiction of Keynes's basic point – be *lower*, not higher, than the own-rates on competing assets. On the basis of Sraffa's comment the critics apparently take it for granted that

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<sup>1</sup> I wish to thank Jonathan Smith at the Wren Library for his kind assistance in accessing the Sraffa papers. I am grateful also to Eric Rahim for discussions concerning the matters investigated in this paper.

<sup>2</sup> Another well-known recent contribution critical of Keynes's Chapter 17 is that by Barends and Caspari (1997). These authors, however, do not seem to have consulted the Sraffa papers and do not raise this particular issue.

Keynes must have made a major error. That presumption requires investigation. (ii) A further criticism is that Keynes mis-applied the term ‘own-rates’ in using it as a general designation of *returns* (rather than costs) on all sorts of assets; critics have gone so far as to say that Keynes ‘confused’ own-rates with marginal efficiencies. This also needs looking into.

### The own-rate of interest

“The ‘own-rate of interest’ of a commodity is defined as the ratio of a definite quantity of a commodity, say wheat, available at a future date (t+1), exchanged against a definite quantity of the same commodity at date (t).”<sup>3</sup> Fisher (1896, pp.8ff)

Own-rates, that is to say, emerge in the course of forward trading in commodities. When a commodity, e.g. wheat, is sold forward – i.e. with price contract made at time t but delivery from seller to buyer delayed until time t+1 – the seller is in effect *borrowing* the commodity and pays interest (which may be positive or negative) accordingly. Note also, that the forward seller, in carrying the commodity through time, may be said to be ‘investing’ in the commodity as an asset (the yield on which depends on the extent to which the forward price exceeds the spot price). (Corresponding to the forward seller’s operation, a forward buyer is *lending* the commodity, agreeing at time t to delayed delivery in t+1; the lender’s return may be positive or negative depending on the relationship of the spot and forward prices.)

Consider a couple of illustrations of forward trading, taking wheat as the representative commodity.  $P_s$  represents the spot price of wheat (i.e. the price of wheat for delivery at the present time t), and  $P_f$  the forward price for future delivery (at time t+1).  $P_f$  is settled at time t to be paid at t+1.

- (1) Assume that the spot price of wheat ( $P_s$ ) = £1 per quarter and, with the price of wheat expected to rise, the forward price ( $P_f$ ) = £1.20 and the money rate of interest ( $r$ ) = 5%. The own rate on wheat is calculated as follows. Suppose a trader buys (at t) 100 wheat spot for £100 which he sells forward for £120; in ‘borrowing’ wheat our trader pays  $£(100 + 5) = £105$  for this operation, which (at  $P_f$  wheat = £1.20) is covered by the sale in t+1 of (no more than) 87.5 wheat (that sale bringing in £105). That is to say, the borrower of wheat surrenders 87.5 wheat at t + 1 for 100 wheat borrowed in t: the own rate on wheat (cost to the borrower) in these circumstances is therefore *minus* 12.5%. (Alternatively, the yield on borrowing - in effect ‘investing’ - in wheat = *plus* 12.5%).

Corresponding to the above deal, an agent sells 100 wheat spot at for £100 and buys it forward for £120. The return in wheat on thus lending 100 wheat is given by the quantity of wheat (at  $P_f$  per unit) which can be bought at t+1 with total proceeds of £115: that sum buys 87.5 wheat, thus 100 wheat in t has brought in only 87.5 wheat in t+1. The return to lender = minus 12.5 %.

- (2) If, with the price of wheat expected to *fall*,  $P_f$  wheat (at say £0.80 per unit) is less than  $P_s$  wheat (£1.00), the forward seller (borrower) of wheat will find that his costs exceed

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<sup>3</sup> Formally, denoting spot and forward prices of a commodity by  $P_s$  and  $P_f$  respectively, and the rate of interest on money by  $r$ , the commodity rate/own rate is defined by Sraffa (1932) as the quantity of the commodity (per 100 units of that commodity) which can be purchased with the following sum of money  $(1 - P_f/P_s + r)$ ; the value of this rate may exceed the value of  $r$  (when  $P_s > P_f$ ), fall below  $r$  (when  $P_f > P_s$ ) or be equal to  $r$  (when  $P_s = P_f$ ).

his returns. In this instance, with  $r$  again = 5%, the money cost of borrowing 100 wheat = £105 while the forward sale at  $t+1$  brings in only £80; 131.25 wheat have to be sold to cover the costs incurred – meaning that the cost in terms of wheat on ‘borrowing’ wheat is 31.25%. (From the ‘investment’ perspective, the yield is minus 31.25%.)

In this case the corresponding lender of wheat makes a positive return. 100 wheat sold spot ( $t$ ) for £100 yields, together with £5 interest, £105 in  $t+1$ , which buys ( $P_f = 0.80$ ) 131.25 corn. 100 wheat in  $t$  has been exchanged for 131.25 wheat in  $t+1$ . Return to lender in terms of wheat = plus 31.25%.

A question of terminology arises at this point: when we compare own-rates under different conditions, or observe changes occurring in own-rates, how do we describe these situations – are the own-rates in question to be reported as relatively ‘high’ or ‘low’, are changing rates perceived as increasing or decreasing? We encounter here a potential source of confusion – in that a given situation will be described differently according to the observer’s particular perspective or convention adopted. For instance, compare the rates faced by forward sellers in our two examples above. Viewing own-rates as representing the *cost of borrowing*, in case 1 the own-rate at minus 12.5% is perceived as much *lower* than the rate of plus 31.25% of case 2. On the other hand, taking the own-rate as indicating the yield derived from forward selling (‘borrowing’ or ‘investing’ in wheat), the return of plus 12.5% in case 1 is evidently *higher* than the loss of 31.25% in case 2. Is the own-rate on wheat higher or lower in situation 1 than in situation 2?

Again, if the price level is falling, and forward prices are falling below spot prices, will own-rates be in consequence increasing or decreasing? If the own-rate is interpreted as cost of borrowing, it will be understood that own-rates are rising; from the alternative perspective, yields (and own-rates) will be seen as falling. Which is it?

No such questions would arise if all parties involved in debates concerning own-rates adopted the same convention - viewing own-rates from the same perspective – no matter whether they regarded the own-rate as the *cost* of borrowing (positive or negative) or as the *yield* (positive or negative) to the borrower of/investor in a commodity or other asset.

But these questions *do* arise. They arise for the reason that in writing about own-rates Keynes and Sraffa adopted different conventions – Sraffa taking commodity own-rates as representing the costs of borrowing, and Keynes, for the most part, treating own-rates as corresponding to the yields on commodities or assets. The matter at issue is this: how do own-rates behave as recession develops? Keynes and Sraffa *apparently* hold opposite views. Keynes contends that slump conditions are due to the fact that, when aggregate demand is dropping, and returns (own-rates) on non-money assets are falling, the own-rate on money keeps up (or declines at a slower rate), forcing out of production rival capital assets. By contrast, and contrary to Keynes’s prediction, Sraffa states that if the general level of prices is falling in depression conditions, the money rate will be *below* other rates. Recent commentators – Ranchetti (2000; and Kurz (2007, 2012) interpret Sraffa’s unpublished critique of Keynes as seriously damaging to Keynes’s fundamental argument in the *General Theory* that the attractiveness of money as a store of value can be responsible the volume of aggregate demand falling far below that required for full employment.

We shall return to the question of how damaging Sraffa's comments actually are. Before we do, however, we need to look more closely into Sraffa's and Keynes's particular ways of handling the concept of the own-rate.

### **Sraffa: commodity-rates**

As is well-known, Sraffa, in his 1932 demolition of Hayek's *Prices and Production*, made use of the notion of own-rates to demonstrate that, contrary to Hayek's neoclassical view, there existed within the economy not just one 'natural rate' of interest, but as many natural rates (i.e. own-rates or 'commodity-rates' as he termed them) as commodities which could be lent and borrowed. (Sraffa's point was, of course, that, given the existence of a multiplicity of different 'natural rates', it made no sense for Hayek to recommend, as a remedial policy measure, setting the money rate to equality with a unique 'natural rate'.) Thus Sraffa (1932, p.50):

Loans are currently made in the present world in terms of every commodity for which there is a forward market. When a cotton spinner borrows a sum of money for three months and uses the proceeds to purchase spot, a quantity of raw cotton which he simultaneously sells three months forward, he is actually 'borrowing cotton' for that period. The rate of interest he pays, per hundred bales of cotton, is the number of bales that can be purchased with the following sum of money: the interest on the money required to buy spot 100 bales, plus the excess (or minus the deficiency) of the spot over the forward prices of the 100 bales.

Note that in this passage Sraffa writes of the own-rate on cotton as the cost of borrowing cotton rather than the yield on the cotton spinner's investment.

In unpublished notes commenting on Chapter 17 of Keynes's *General Theory* Sraffa maintains the same convention. By own-rates he means the terms on which a commodity or asset is borrowed, implying that when commodity prices are falling and  $P_{t+1}^e < P_t$  so that  $P_f < P_s$ , the own-rates on non-money commodities are necessarily higher than the rate on money:<sup>4</sup>

If there is one article [in universal demand] . . . [and if] this asset cannot be produced (paper money), its demand will increase and can only be met by a continuous rise in its value, i.e. fall in general prices. If this hoarding is expected to go on steadily, and all prices are expected to fall in terms of money, the result will be that all own rates of interest of commodities will be higher than the money rate (this is Fisher's case: an the expected appreciation or depreciation is the only possible cause of divergence in rates of interest).

Thus in the Keynes case [falling prices], the result on rates of interest is opposite to Keynes's conclusion.

Sraffa is saying – apparently contradicting Keynes's account - that with falling prices the own-rates on all non-money commodities become *higher* than the rate on money. We will come back to this (from a Keynesian perspective – 'startling'- proposition) to consider its (by no means self-evident) meaning and significance as a criticism of Keynes's Chapter 17 own-rates analysis.

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<sup>4</sup> This, and all subsequent Sraffa quotations in this paper, are from his unpublished notes (Sraffa Papers, I/100).

## Keynes on asset returns – own-rates and marginal efficiencies

Let us turn now to Keynes's usage in the *General Theory*. It is clear that at the very beginning of Chapter 17 that Keynes had been studying Sraffa's review of Hayek. He observes (p.222):

The money rate of interest – we may remind the reader – is nothing more than the percentage excess of a sum of money contracted for forward delivery, e.g. a year hence, over what we may call the 'spot' or cash price of the sum thus contracted for forward delivery. It would seem, therefore, that for every kind of capital asset there must be an analogue of the rate of interest on money. For there is a definite quantity of (e.g.) wheat to be delivered a year hence which has the same exchange value to-day as 100 quarters of wheat for 'spot' delivery. If the former quantity is 105 quarters, we may say that the wheat-rate of interest is 5 per cent per annum; and if it is 95 quarters, that it is *minus* 5 per cent per annum. Thus for every durable commodity we have a rate of interest in terms of itself, - a wheat-rate of interest, a copper-rate of interest, a house-rate of interest, even a steel-plant rate of interest.

The proposition 'that for every kind of capital asset there must be an analogue of the rate of interest on money' is in fact the key insight Keynes took from Sraffa's discussion of commodity rates. It was this understanding of the existence of a multiplicity of 'natural rates' which pointed Keynes (generalizing from 'natural rates' on commodities to 'natural rates' on all sorts of capital assets) towards a new theory of asset returns in place of the traditional 'productivity and thrift' theory of interest, an analysis which introduced the liquidity preference theory of interest on money.<sup>5</sup>

Having introduced the idea (though not yet the term) of an own-rate on commodities analogous to the rate of interest on money, Keynes offers an example to illustrate the relationship between a commodity own-rate and the rate on money.

Let us suppose that the spot price of wheat is £100 per 100 quarters, that the price of the 'future' contract for wheat for delivery a year hence is £107 per 100 quarters, and that the money rate of interest is 5 per cent.; what is the wheat-rate of interest? £100 spot will buy £105 for forward delivery, and £105 for forward delivery will buy  $105/107.100 (= 98)$  quarters for forward delivery. Alternatively £100 spot will buy 100 quarters of wheat for spot delivery. Thus 100 quarters of wheat for spot delivery will buy 98 quarters for forward delivery. It follows that the wheat-rate of interest is *minus* 2 per cent per annum.

From that perspective – in the manner of Sraffa the own-rate is viewed as the cost of borrowing wheat - that own-rate is reported as negative.<sup>6</sup> *But Keynes immediately changes his viewpoint* – and for the remainder of Chapter 17 through which his theory of the working of a monetary economy is developed, treats the own-rate as measuring the yield on an asset. (Had Keynes adopted that convention in expounding the above example, the wheat-rate of interest would of course have come out at *plus* 2 per cent.)

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<sup>5</sup> See Grieve (2012) in which the circumstances under which Keynes arrived at his new theory of interest after rejecting the traditional 'productivity and thrift' theory are examined.

<sup>6</sup> The fact that the cost of borrowing wheat is represented as negative, makes one wonder if Keynes was already thinking in terms of own-rates as representing yields rather than borrowing costs.

In the very next paragraph following his own-rate example Keynes writes of own-rates as corresponding to the marginal efficiencies (in other words, the *yields*) of assets, and even introduces a preliminary pointer to his key argument – that the own-rate on money (meaning the *yield* on money) as an asset may conceivably come to exceed the own-rates (yields) on other (manufactured) assets, and knock them out of production. Thus Keynes:

. . . the relation between the ‘spot’ and ‘future’ contracts, as quoted in the market, is notoriously different for different commodities. This, we shall find, will lead us to the clue we are seeking. For it may be that it is the *greatest* of the own-rates of interest (as we may call them) which rules the roost (because it is the greatest of these rates that the marginal efficiency of a capital-asset must attain if it is to be newly produced); and there are reasons why it is the money-rate of interest which is often the greatest (because, as we shall find, certain forces, which operate to reduce the own-rates of interest on other assets, do not operate in the case of money.

There can be no doubt that Keynes’s focus when reference is made to own rates is now on the magnitude of the net gains yielded to their holders by different assets – in particular on the relationship between the yield on money and the yields (or marginal efficiencies of capital) obtainable on produced assets.

The analysis continues by introducing the several ‘attributes’ which Keynes considers determine the yields on assets of different sorts. The intention is, with respect to non-money assets, to compare ‘the total expected return from the ownership of an asset over a period’ with the yield to the wealth-holder generated by money as an asset. Keynes is absolutely explicit – he is now focusing his attention on asset returns and, even though he reverts here to Sraffa’s term ‘commodity rates’, there can be no doubt that he has not reverted to the meaning Sraffa attached to that term. Over the next three or four pages the discussion continues, with Keynes developing his distinctive Chapter 17 account of the several factors which contribute to the returns on assets of different sorts. He sums up (p.226) the argument in which the three ‘attributes’ – denoted by  $q$ ,  $c$  and  $l$  – have been introduced:

It follows that the total return expected from the ownership of an asset over a period is equal to its yield *minus* its carrying cost *plus* its liquidity premium, i.e. to  $q - c + l$ . That is to say,  $q - c + l$  is the own-rate of interest of any commodity, where  $q$ ,  $c$  and  $l$  are measured in terms of itself as the standard.

Keynes then comments on the features of different assets:

It is characteristic of instrumental capital (e.g. a machine) or of consumption capital (e.g. a house) which is in use that its yield should normally exceed its carrying cost, whilst its liquidity-premium is probably negligible; of a stock of liquid goods or of surplus laid-up instrumental or consumption capital that it should incur a carrying cost in terms of itself without any yield to set off against it, the liquidity-premium also being virtually negligible as soon as stocks exceed a moderate level . . . ; and of money that its yield is *nil*, its carrying cost negligible, but its liquidity-premium substantial.

The explanation of the determination of own-rates is completed by taking account of the money values of the yields obtainable on the various assets, and the point is made that the efforts of wealth-holders

seeking to maximize returns will tend to establish an equilibrium in which the monetary returns on different assets are equalized. (pp.227-8):

To determine the relationships between the expected returns on different types of assets which are consistent with equilibrium, we must also know what the changes in relative values during the year are expected to be. Taking money (which need only be a money of account for this purpose, and we could equally well take wheat) as our standard of measurement, let the expected appreciation (or depreciation) of houses be  $a_1$  and of wheat  $a_2$ . . . . It will also be useful to call  $a_1 + q_1$ ,  $a_2 - c_2$  and  $l_3$  . . . the house-rate of money-interest, the wheat-rate of money-interest and the money-rate of money-interest respectively. With this notation it is easy to see that the demand of wealth-owners will be directed to houses, to wheat or to money, according as  $a_1 + q_1$ , or  $a_2 - c_2$  or  $l_3$  is greatest. Thus in equilibrium the demand-prices of houses and wheat in terms of money will be such that there is nothing to choose in the way of advantage between the alternatives: - i.e.  $a_1 + q_1$ ,  $a_2 - c_2$  and  $l_3$  will be equal.

Ranchetti reports that Sraffa took exception to Keynes's treatment of own-rates, remarking – correctly – that in Chapter 17 he put forward three different definitions of own-rates, the first of which was not consistent with the other two. While we have already made reference to all three, a summary may at this point be useful. Firstly, Keynes proposed a definition corresponding to Sraffa's concept of commodity rates – Keynes describing a rate on assets analogous to the rate paid for borrowing money and illustrating the point with a numerical example of the value of the 'wheat-rate of interest', understood as the *cost*, in terms of wheat, of 'borrowing wheat'. This is followed, secondly, by a definition in terms of the *yields* (reflecting asset properties, rather than spot and forward prices) obtainable on assets measured in terms of the assets themselves. Thirdly, asset 'rates of money interest' are defined as the asset yields (of the second definition) measured in terms of money.

Not surprisingly, Sraffa had no objection to Keynes's first definition (corresponding to his own); he was not however happy with the other two. Sraffa maintained that, as he understood and defined the concept of an own-rate, the value of that rate depended, given the rate on money, solely on the relationship between spot and forward prices. Thus Sraffa (quoted by Ranchetti, p.323):

. . . if no changes in price are expected all commodities will have the same rate of interest, whether it be a delight or a nuisance to possess them; the discrepancies can only be due to expected changes in prices.

As Sraffa understood the concept, nothing else had any bearing on commodity (own) rates, yet here was Keynes bringing in considerations of productivity and carrying costs associated with various sorts of assets and giving these factors a role in determining own-rates. For Sraffa, this was evidence that Keynes had, so to say, gone off on the wrong tack as regards the nature and role of own rates. Thus, as reported by Kurz (2010, p.200), quoting Sraffa, 'K. has at the back of his mind two wrong notions, which have entirely misled him', these 'wrong notions' being (as explained by Kurz) '(i) that commodities are borrowed to be kept to the end of the loan, and (ii) that only durables can be borrowed'. As Sraffa put it, even 'fresh fish' can be 'borrowed' – borrowed if need be for 100 years - not though for subsequent consumption but to be sold forward 'as the standard in which a debt is fixed'. In the context of commodity trading 'borrowing' an asset need not imply its physical carriage

through time by the borrower, as does the acquisition of durable assets for investment purposes.<sup>7</sup> In Sraffa's opinion own-rates are properly associated only with short-term commodity trading and not with long-term investment in durable capital goods. His response was to suggest that if Keynes wanted to talk about investment, as distinct from forward trading in commodities, he should have been dealing with asset returns expressed in terms of the marginal efficiencies of these assets. In his informal comments Sraffa keeps returning to this point. Thus (the abbreviations are Sraffa's):

Confusion of the rate of interest and marg. product. In Sect II Keynes tries to build up the rate of int of each commodity by adding up the advantages and disadvantages of holding that particular article. On pp.226-7 he defines them as the own rates!

Now it is necessary to emphasise that the advantages involved in holding a commodity have no relation to its 'own particular rate of interest'; and indeed no properties of that commodity (apart from expected price change) have any relations to the differences between this rate and other rates. For when one borrows, whether money or anything else, as a rule he does not keep the proceeds but uses them to buy the things he wants for production – and it is irrelevant to him whether he starts by paying in money or wheat – and even the commodities he buys, as a rule he consumes productively, and does not hold – so that he is not interested in whether they have carrying costs or advantages.

Referring to Keynes's representative assets and their yields '(houses-use; money – liq pref; wheat – carrying costs)' Sraffa observes:

These however are the properties of investments in fixed capital, and it is to its marg. prod that these arguments ought to refer.

But that would appear to be *in effect* just what Keynes was doing in Chapter 17, at least after he had moved on from the introductory treatment *a la* Sraffa. Keynes's 'own-rates' representing asset *yields* are the equivalent of marginal efficiencies. The own-rate<sup>8</sup> is the net return to the asset holder as a percentage of the initial cost of the asset; the marginal efficiency corresponds to the rate of discount which equates the net yield on the asset to the cost of the asset. It seems absolutely certain therefore that in Chapter 17, apart from the initial introductory passages, Keynes's use of the term 'own-rates' carried the same meaning as 'marginal efficiency of capital', the usage he subsequently (by 1937) came to favour.

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<sup>7</sup> Nerio Naldi (2010, p.3) offers a very helpful elucidation of what Sraffa may have had in mind in presenting the example of a cotton spinner buying raw cotton spot to sell forward: '. . . the reason why cotton spinners should follow this line of conduct may not be so obvious as Sraffa seems to imply: their ordinary activity leads them to buy cotton to use and transform it, not to keep it for a period and return it afterwards. An explanation for their selling cotton forward may be based on the observation that cotton spinners, assuming that prices of raw and wrought cotton move in the same direction, in order to hedge against future variations in the price of wrought cotton, may sell forward the same amount of raw cotton bought spot. If prices go down, the profits obtained on the forward contracts may compensate for the loss on the price of wrought cotton, which has to be sold at a price lower than expected. If prices go up, the extra profits obtained selling wrought cotton will be cancelled out by the loss on the forward contracts. This explanation is closely mirrored by a passage from Marshall's *Industry and Trade* (Marshall, 1923, pp.259-260).' Note that the cotton spinner does not hold a surplus stock of cotton over the period of production, but buys only when the forward contract becomes due.

<sup>8</sup> For convenience we use the term 'own-rate' to denote not just the return on an asset in terms of that asset itself, but also the return on an asset in terms of money (what Keynes called the 'asset-rate of money-interest').

It is interesting that, as commentators have remarked, in post-*General Theory* writings Keynes made no further mention of own-rates, referring instead to the marginal efficiencies of capital-assets. The following passages illustrate this terminological change, and by their similarity to the argument of Chapter 17, confirm, with no room for doubt, that by 'own-rates' Keynes meant in that Chapter (apart from the initial passages) the what he would later describe as the (prospective) yields or marginal efficiencies of the assets in question.

From 'The Theory of the Rate of Interest' (Keynes, 1973, pp.101-102), written in 1937 for a festschrift in honour of Irving Fisher:

. . . we can conveniently say that interest on money measures the marginal efficiency of money measured in terms of itself as a unit.

Money is not peculiar in having a marginal efficiency measured in terms of itself. Surplus stocks of commodities in excess of requirements and other capital assets representing surplus capacity may, indeed, have a negative marginal efficiency in terms of themselves. If we know the relation between the present and expected prices of an asset in terms of money we can convert the measure of its marginal efficiency in terms of itself into a measure of its marginal efficiency in terms of money by means of a formula which I have given in my *General Theory*, p.227.

The effort to obtain the best advantage from the possession of wealth will set up a tendency for capital assets to exchange, in equilibrium, at values proportionate to their marginal efficiencies in terms of a common unit. That is to say, if  $r$  is the money rate of interest (i.e.  $r$  is the marginal efficiency of money in terms of itself) and  $y$  is the marginal efficiency of capital asset A in terms of money, then A will exchange in terms of money at a price such as to make  $y = r$ .

Thus in 1937 Keynes presents a resumé of the argument originally put forward in Chapter 17, but where previously he spoke of own-rates, he now refers to marginal efficiencies. The argument is the same, only the terminology is different. We repeat that specification of asset yields in terms of 'own rates' (according to Keynes's usage) is exactly equivalent to specification of yields as 'marginal efficiencies of capital'

We may ask – how did it happen that Keynes took this potentially confusing expositional route – starting in chapter 17 by adopting Sraffa's concept of the commodity rate as the cost of 'borrowing' a commodity, then for the greater part of Chapter 17 conducting the discussion - from the opposite perspective - in terms of own-rates understood as corresponding to asset yields, and eventually, while maintaining that same perspective, representing wealth-owners as choosing between alternative assets on the basis of these assets' marginal efficiencies.?

Given that Keynes had taken on board from Sraffa's analysis the notion of a multiplicity of commodity rates, it would seem natural for Keynes, at least initially, to express his new conception in the Sraffian terms from which it had evolved. Why though did Keynes so quickly thereafter adopt a different perspective on own-rates? With the analysis extended from forward trading in commodities to a more general account of the returns on alternative assets and choice between them, it was, we suggest, quite understandable for Keynes to treat profits derived from investment in such assets as instances of *positive yields* (i.e. positive own-rates) rather than as *negative costs*, as maintenance of the Sraffa convention of reading own-rates as corresponding to the cost of borrowing would of course have required. So it looks as if Keynes slipped into a different – and indeed for his purpose a more

appropriate – usage as the argument of Chapter 17 got under way, though without giving readers explicit warning of what was happening.

But treatment of asset choice in terms of own-rates did not last beyond the writing of the *General Theory*; in adopting the alternative terminology of marginal efficiencies of capital Keynes was employing the more conventional usage. It cannot be the case that Keynes's reason for so doing was that he had come to the conclusion that the *substance* of the own-rate treatment was somehow erroneous and had to be abandoned: as we have noted the essence of Keynes's analysis remained unchanged, it was only the language that altered. So why did he go for marginal efficiencies?

In the context of long-term investment, which was the subject of Keynes's concern, short-run deviations of spot from forward prices are essentially beside the point. The expected return on investment depends on factors of productivity and cost ( $q$  and  $c$ ), together with changing prices ( $a$ ), all of which may affect a project over many years, rather than on transient disparities of spot and forward commodity prices. In other words, in the context of investment, we may as well suppose that spot and forward prices coincide, and concentrate on the possible longer-term trends of relevant values. It may be that, with such considerations in mind, Keynes came to prefer 'marginal efficiencies' simply because – and this, as Ranchetti notes, was Sraffa's view also – that conventional terminology seemed more appropriate in relation to long-term investment and decision-making, than did the language of forward trading in commodities. Keynes's own-rates usage had in fact broken with convention: interest is after all normally understood to be a payment from a borrower to a lender, so that treatment of asset returns to asset owners explicitly in terms of a rate of profit or loss – i.e. in terms of marginal efficiencies - may be preferred as more natural and fitting. It is conceivable also that Keynes came to learn of Sraffa's dislike of his use of the own-rates terminology and conceded to his disapproval.<sup>9</sup>

The important point is that, whatever the reasons for the changes in terminology, after an introductory illustration of commodity rates presented in Sraffa format, all Keynes's subsequent analyses of asset properties and asset choice – whether in terms of own-rates, commodity rates, or marginal efficiencies – focused on asset *yields*, on the returns to the asset-holder, and *not* – as was the case in Sraffa's seminal account of forward trading – on the costs incurred by the borrower.

Finally, as we complete our review of analyses involving commodity rates, own-rates and marginal efficiencies, this seems an appropriate point at which to deal with a confusion we have uncovered. Barends and Caspari (1997) discuss the relationship between own-rates and marginal efficiencies, but get it wrong. They state (p.291):

Arbitrage equilibrium establishes a vector of spot and demand prices causing expansion of output of those commodities which have a forward/expected future price below their demand price. . . . their own-rates of interest in terms of themselves will be higher than the own-rates of interest of money. Keynes takes the marginal efficiency of capital of such a commodity as synonymous with its own-rate of interest, as is especially clear in his contribution to the Fisher Festschrift. . . . A situation characterized by the spot price of a commodity exceeding its forward price corresponds to the marginal efficiency of this commodity being higher than the rate of interest.

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<sup>9</sup> While Kurz (2010, pp.184-185 and p.187) suggests that Sraffa's notes on Chapter 17 were probably never shown to anyone, Ranchetti (2002, p.326) is of the opinion that Keynes did come to know of Sraffa's reservations about the chapter, and may have responded by adopting the more conventional usage.

We have no problem with the statement that ‘Keynes takes the marginal efficiency of capital of a commodity as synonymous with its own-rate of interest’, but cannot accept that a ‘situation characterized by the spot price of a commodity exceeding its forward price corresponds to the marginal efficiency of this commodity being higher than the rate of interest’. In fact, if the spot price exceeds the forward price, the own-rate on that commodity (in Keynes’s sense of the yield on carrying that commodity through time) will be *less* than the rate of interest, as, equivalently, will be the marginal efficiency of an investment in that commodity.<sup>10</sup> For the marginal efficiency of an investment in a commodity to exceed the rate of interest, the forward price of that commodity would have to exceed the spot price (compare Barends and Caspari).

What Barends and Caspari have apparently done is confuse the return from investing in *a commodity*, the price of which is expected to fall (unprofitable outcome) with the return from investing in *the means of producing a commodity*, the value of which happens (for the time being) to be higher than its normal, cost of production price (profitable outcome).<sup>11</sup>

### **Keynes’s key proposition**

The discussion of own-rates and asset choice in Chapter 17 leads directly to the key proposition advanced in that chapter – indeed to the key proposition of Keynes’s whole theory of ‘employment, interest and money’ – that, on account of liquidity preference, the own-rate on money may, when own-rates on new capital goods are falling, maintain a relatively higher value, with the consequence that as investment projects become progressively less competitive against the attractions of liquidity, the volume of investment diminishes and the economy falls into recession.

On asset choice Keynes observed (as quoted above) that ‘the demand of wealth-owners will be directed to houses, wheat or money according as  $a_1 + q_1$  or  $a_2 - c_2$  or  $l_3$  is greatest’. He then arrives (pp.228-9) at the critical proposition:

Let us suppose (as a mere hypothesis at this stage of the argument) that there is some asset (e.g. money) of which the rate of interest is fixed (or declines more slowly as output increases than does any other commodity’s rate of interest) . . . [the consequence is that] if  $q_1$  and  $-c_2$  continue to fall, a point comes at which it is not profitable to produce any of these commodities, unless the cost of production at some future date is expected to rise above the present cost by an amount which will cover the cost of carrying a stock produced now to the date of the prospective higher price.

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<sup>10</sup> Suppose (as postulated by Barends and Caspari) in the case of commodity  $x$ , the spot price ( $P_s$ ) exceeds the forward price ( $P_f$ ); specifically  $P_s = £1.10$  per unit and  $P_f = £1.00$ ;  $r = 5\%$ . If 100 units are bought spot for £110 plus £5.00 interest, and sold for £100, net cost in money = £15.00, and in units of  $x$  (at  $P_x = £1.00$ ) = 15. Thus 15 $x$  have to be handed over as price of borrowing 100 $x$ ; commodity rate (Sraffa / cost of borrowing in terms of  $x$ ) = 15%; own-rate (Keynes / yield) = *minus* 15%. In terms of the MEC (or IRR): investment costs £110, proceeds £95; PV of proceeds = £90.5; thus NPV is negative. MEC (loss of £15 on £110 invested) = minus 13.6%.

<sup>11</sup> It rather looks as if Kurz (2010) may have been similarly confused. A puzzling passage (p.16) reads: ‘Next Keynes brings in the marginal efficiency of capital and compares it with the rate of interest. . . . It is . . . misleading what Keynes says, because the rate of interest of an object, whose actual price exceeds cost of production, is according to the definition given on pp.222-3 [the Sraffa definition] (relatively) high and not *low*.’ The cost of borrowing that ‘object’ may be high and the yield on holding it low, but there is nothing paradoxical in the fact that, at the same time, the return on investing in the means of producing more of the commodity concerned, given that its current price exceeds the cost of production, is likely to be attractive.

It is now apparent that our previous statement to the effect that it is the money-rate of interest which sets a limit to the rate of output, is not strictly correct. We should have said that it is that asset's rate of interest which declines most slowly as the stock of assets in general increases, which eventually knocks out the profitable production of each of the others . . . As output increases, own-rates of interest decline to levels at which one asset after another falls below the standard of profitable production; - until, finally, one or more own-rates of interest remain at a level which is above that of the marginal efficiency of any asset whatever.

Keynes goes on, of course, to make the point that it is money which – because of its special properties - is the problematic asset whose own-rate can remain at too high a level.

Thus we may visualize a situation such as the following. From an initial state of business optimism and high employment, something happens to cause a revision of expectations and put a damper on business confidence. Estimated returns as reflected in  $q - c$  fall, output and employment decline, further reducing  $q - c$ ; product prices may also start to fall, bring negative 'a's into the reckoning. In these circumstances 'l' representing the appeal of liquidity, may actually increase. Thus (in diagrammatic terms) the marginal efficiency of capital schedule may be supposed to slip downwards against a rate of interest which is certainly not adjusting as required to maintain investment: the result is that less and less spending on new capital assets is undertaken and the economy, with falling prices, slides deeper and deeper into recession. In these circumstances 'the greatest of the own-rates of interest', that on money, does indeed, as Keynes put it, 'rule the roost'.

### **Sraffa's objections and the critics' responses**

That is clearly the scenario (an insatiable demand for money, accompanied by falling prices), to the description of which by Keynes in terms of own-rates Sraffa, in the passage we quoted above, was objecting. We noted Sraffa's alternative account to the effect that, with deflation, far from it being the case that a dominant own-rate on money 'ruled the roost', the own-rate on money would have *fallen* below the own-rates on non-money assets. At this stage in the argument it is worth quoting the Sraffa passage in full (including the opening sentence, the significance of which the commentators neglect). The complete passage reads:

What Keynes ought to have spoken of throughout (e.g. p.229 top) is marg. efficiencies (sic) of various articles, and not their rates of interest. Then, if there is one article the marg. eff. of which never falls below say 5% (this being the valuation of the pleasure people derive from hoarding any quantity of it) the production of all other durable assets will stop when their stocks are such that marginal efficiency has come down to that level – for otherwise they could not be sold at cost - and all resources saved will be used for producing the hoardable asset. If this asset cannot be produced (paper money). Its demand will increase and can only be met by a continuous rise in its value, i.e. fall in general prices. If this hoarding is expected to go on steadily, and all prices are expected to fall in terms of money, the result will be that all own-rates of interest of commodities will be higher than the money rate (this is Fisher's case: the expected appreciation or depr. (sic) is the only possible cause of divergence in rates of interest).

Thus, in the Keynes case the result on rates of interest is opposite to Keynes's conclusion.

We will return shortly to what is significant in that opening sentence, but for the moment we simply note that the commentators – Ranchetti, Kurz and Oka – make no mention of it. That omission, we suggest, indicates the critics' failure to understand the point that Sraffa was making in the passage. As we shall explain below, we take Sraffa's concern to be about Keynes's (as he regards it) inappropriate use of the own-rates terminology. Sraffa is chiding Keynes for talking about own-rates rather than marginal efficiencies – by showing how the discussion ought to have been presented - *but nothing more than that*. But that is not how the critics have read it: they take it to mean that Sraffa was throwing out the whole argument of Chapter 17, rejecting Keynes's essential proposition – not just complaining about Keynes's way of presenting it – that liquidity preference could so undermine the will to invest as to cause aggregate demand to fall far short of what was necessary for full employment (that, in other words, the money rate of interest could come to 'rule the roost'). They therefore conclude (with surprising readiness) that the Keynes analysis must be fundamentally incorrect. Let us review their responses.

Ranchetti (2002, pp.322-3) having referred to the 'confusion into which Keynes falls in the second section of Chapter 17 . . . when he identifies the commodities own-rates of interest with their marginal efficiencies', and noting Sraffa's objection to Keynes attribution of own-rate differences to 'the objective advantages or disadvantages which the different commodities provide to their owners', comments as follows:

. . . according to Sraffa, Keynes' argument in the second section of Chapter 17 . . . should be related to investment in fixed capital rather than to borrowing activity. If it is so, then it would have been more logical to refer directly to the marginal efficiencies of different capital goods, rather than to their own-interest rates. However, even if this necessary correction is granted, Keynes' main conclusion – i.e. that, because of the 'special characteristics' of money, the money rate of interest is more 'reluctant' to fall relatively to the own-rates of interest of the other assets (and therefore could remain fixed at a higher level) – would be self-contradictory.<sup>12</sup> In fact, as Sraffa argues in a passage in which he develops Keynes's argument in such a way to exhibit its internal inconsistencies . . .

Here follows the already quoted Sraffa passage (minus the introductory sentence), ending with the conclusion – apparently contradicting Keynes - that, when all prices are expected to fall in terms of money 'the result will be that all own rates of interest of commodities will be higher than the money rate'. Note that this result, as mentioned above, is understood by Ranchetti to refer to Keynes's 'main conclusion'.

'Self-contradictory' is presumably a verdict on Keynes's contention that, supposing prices to be falling, the own-rate of on money will be higher than rates on other assets; the fact that Keynes was referring to asset yields is overlooked. Thus Keynes is alleged to have confused own-rates with marginal efficiencies, and to have arrived at his 'main conclusion' via a 'self-contradictory' argument. Despite the rather startling nature of this verdict – end of story, no questions asked.

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<sup>12</sup> Even if asset returns were described in terms of marginal efficiencies, with low marginal efficiencies of capital goods relative to the marginal efficiency of money, the money rate of interest could still be said to 'rule the roost'. The critics seem to think that because Keynes (apparently) got the relationship between the rate of interest on money and rates on other assets 'wrong' Keynes was talking nonsense.

Kurz (2010, pp.197-202; 2012, p.49) goes to town on what he takes to be the incompetent character of Keynes's analysis in Chapter 17. As regards the issues with which we are here concerned, Kurz states that 'Keynes advocates different concepts of commodity rate of interest that are not compatible with one another' and that 'he erroneously admits Fisher's effect for all commodities, except money'. Referring to Keynes's explanation of how own-rates can be adjusted to take account of price changes, he remarks:

Sraffa spots immediately that the usual choice of *money as standard of value* has an important implication: 'The point is that, in the case of the rate of the article chosen as standard, *the effect upon it of the expected depreciation is concealed*' (emphasis added). This is a crucial point, which Keynes apparently had lost sight of, and which had seriously misled him. For example, if an increase in the amount of money happens to lead to a fall in the value of money, then this would imply an increase in the 'money-rate of wheat interest', a fact which, alas, Keynes does not take into account. The same objection appears in several forms.

Presumably this discussion relates to the charge, emphasized by Kurz, that Keynes overlooked the 'Fisher effect' with respect to its implication regarding the relative value of the money rate of interest when prices were falling. Kurz makes much of this supposed neglect of the Fisher effect, interpreting that as the source of Keynes's alleged error.

The commodity rate of interest, Sraffa insists, depends exclusively on expected price changes and is thus defined with respect to the forward price of a commodity. There are two ways in which the commodity rates of interest can become uniform again: either via changes in prices and/or via changes in production. Surprisingly, Keynes accepts both possibilities for all commodities except money. This becomes clear when we consider, for example, the case in which agents develop a large propensity to hoard money. Due to the ensuing depressive tendencies in the economy commodity prices will tend to fall. This implies a rise in the value of money. An expected increase in the value of money implies however a lower 'own rate of money interest', to use Keynes's peculiar concept. Sraffa emphasizes: 'therefore the money rate will be lower than other rates and not higher'. Sraffa adds that this is 'Fisher's effect', which K. admits for all commodities except money. . . . Sraffa concludes: 'Thus in the K. case, the result on rates of int[erest] is opposite to Keynes's conclusion.'

Kurz returns to the charge in his later (2012) paper:

[Sraffa argued], among other things . . . that Keynes inconsistently admitted Fisher's effect for all commodities except money. [This] last objection refers to a situation where, because of the depressive tendencies in the economy, money prices will tend to fall, that is, the value of money will rise. However, an expected rise in the value of money implies a lower 'own rate of money interest', and not a higher one, as Keynes had assumed.

In both papers (2010, 2012) Kurz draws the conclusion:

In Chapter 17 Keynes did not reason correctly and got entangled in a maze of contradictions.

Even Oka (2010, pp.1-4), who sets out to demonstrate that Keynes's theory of interest 'can withstand Sraffa's criticism', apparently accepts that Keynes's analysis involves self-contradiction. Thus Oka (p.4):

Sraffa's second critique concerns Keynes' 'confusion' of the marginal efficiency of capital with the own-rate of interest. The critique appears most clear-cut in his elucidation of the self-contradiction in Keynes' argument. Sraffa remarked that if the marginal efficiency of money is never below 5% and the marginal efficiencies of other assets decline and fall below 5%, then money absorbs demand, which raises the value of money in relation to other assets, which means a decrease in the values of other assets in terms of money, which, in turn, means higher own-rates of interest of those assets than the interest rate of money. This is alleged to be the opposite of what Keynes says.

When money absorbs demand and its relative value continues to rise, the price of another asset is expected to fall in terms of money, i.e.  $p_f < p_s$ . It follows

$$1 - p_f/p_s + r > r .$$

The left-hand side of the inequality represents the own-rate of interest of the commodity according to Sraffa's definition and Keynes' first definition as called by Ranchetti. This inequality certainly shows the own-rate of interest of the commodity is higher than the interest rate of money.<sup>13</sup>

Thus Oka does not appear to have any reservations about Sraffa's view *vis-à-vis* Keynes on the relative values of money and other own rates; he certainly does not suggest that Sraffa's comment may be misleading as to the validity of Keynes's argument. He may also accept that Keynes 'confused' the marginal efficiency of capital with the own-rate on an asset.

Finally we come to Barends and Caspari (1997), strongly outspoken critics of Chapter 17. They investigate closely the own-rates concept, and, as we have noted, comment on the relationship between own-rates and marginal efficiencies, but have nothing to contribute respecting Sraffa's alleged charge that Keynes got relationships between own-rates, under deflationary conditions, the wrong way round. (Presumably, at the time they were writing, the Sraffa papers were not yet available, and that issue had not so far come up.) But we think it significant that although Barends and Caspari are quite unsympathetic to Keynes's attribution in Chapter 17 of a key role to liquidity preference in the causation of unemployment, they do not have a problem with the basic framework of his argument that – as they put it (pp.291-2) – 'in recession, in terms of own-rates, all own-rates of interest will have fallen into line with the own-rate on money'. They would presumably (being sceptical of the value of Keynes's introduction of own-rates) have preferred such discussion to be conducted in terms of marginal efficiencies, and they hold that with falling prices the demand for liquidity can be satisfied through deflation via an increasing real money supply, but they do not ever accuse Keynes of misstating the relevant relationship between the own-rate on money and own-rates on capital assets. Nor do they accuse him of confusing own-rates with marginal efficiencies.

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<sup>13</sup> Oka does not suggest that Sraffa's comment, as a verdict on Keynes, is inappropriate in implying a misunderstanding on Keynes's part. What he does say (p.4) in defence of Keynes is that 'the logic of Sraffa includes no error, but it does not reveal Keynes' self-contradiction'. See Appendix for discussion of Oka's defence of Keynes.

## Two questions

In concluding this paper, two questions need to be answered: (1) To what exactly was Sraffa objecting in his unpublished notes? Was it to the *substance* of Keynes's theory, or only to Keynes's *mode of exposition* (which was certainly at variance with Sraffa's own usage)? (2) Is there something fundamentally wrong with Keynes's analysis in terms of own-rates of the causes of recession – as Ranchetti and Kurz imply? Investigation of the first of these questions should at the same time suggest the answer to the second.

It is clear that the critics, finding issues with Keynes's analysis from their reading of Sraffa's notes, considered the problem to be serious. Ranchetti (2002, p.323) describes Sraffa's objections as 'radical, if not destructive'. Kurz, (2010, p.202) observing that the question regarding Keynes's theory is 'whether his explanation of a lower boundary to the money rate of interest . . . stands up to close examination', answers that 'according to Sraffa it does not. Keynes's argument suffers in particular from neglecting the implications of flexible prices via the value of money for the level of the 'own-rate of money interest''<sup>14</sup>. (This, of course, refers to the supposed 'Fisher effect' point.) He then goes on to refer to Keynes's 'failure'. Ranchetti and Kurz are undoubtedly correct in their estimates of the significance of these Sraffa-inspired<sup>15</sup> criticisms of Chapter 17 *if they call into question* Keynes's contention that liquidity preference is capable of constraining the volume of effective demand to a level too low for full employment. But *was* Sraffa critical of Keynes's *essential* conception? Was there anything fundamentally wrong with Keynes's theory?

The two accusations that concern us here are (a) – relating to question (1) above - that Keynes was confused as to the nature of own-rates, their relationship to the marginal efficiency of capital, and how they were affected by deflation; and (b) – on which the answer to question (2) depends – that Keynes was mistaken in stating, as he did, that in conditions of falling prices, the own-rate on money would be greater than the own-rates on other producible capital assets, forcing them out of production and thus driving the economy into recession.

We begin with (a), the allegation of confusion involving own-rates and marginal efficiencies.

As we have seen, Sraffa took exception to Keynes's use of the concept of 'own-rates'. Following Sraffa in criticism of Keynes's employment of the term, Ranchetti, Kurz and Oka all hold that there is something wrong with his treatment in Chapter 17 of interest rates and asset returns. Keynes is charged with using inconsistent concepts and confusing own-rates with the marginal efficiency of capital.

Sraffa was certainly unhappy with way in which Keynes came to use the designation 'own-rates' in Chapter 17. As we know Keynes generally viewed own-rates as asset returns from the perspective of the asset-holder, while Sraffa's usage was to treat them as costs to the borrower. (The critics – unlike Sraffa - do not appear to have recognized this difference of viewpoints: had they appreciated that difference they would surely not have attributed, as they did to Keynes, so naïve a mistake regarding relative movements of interest rates.) The difference between Sraffa and Keynes with respect to own-rates was however more than just a matter of alternative perspectives: Keynes's and Sraffa's different

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<sup>14</sup> Kurz (2012, p.50), using exactly the same words, re-iterates this verdict.

<sup>15</sup> 'Sraffa inspired'- only in the sense that the commentators have been influenced by Sraffa's criticisms of Keynes; there is no implication that the views of the commentators have been *correctly* derived from Sraffa's observations.

terminological usages resulted from their different opinions as to what these rates can properly be taken to mean. Sraffa, conventionally, understands them as indicating *costs of forward trading in commodities*; Keynes applies the term to *asset returns in a much wider context*.<sup>16</sup> Sraffa objected to Keynes adopting a concept long-established in the economics literature (going back forty years to Irving Fisher), treating it unconventionally as indicative of a yield rather than a cost, employing it in an inappropriate context and explaining its determination in fundamentally different terms. In other words, in his opinion Keynes should not, unilaterally, have attached a label associated with one theoretical concept to a significantly different concept; ‘marginal efficiency’ was, he believed, the appropriate term to use in a different context – in relation to choice amongst durable capital assets.

While Sraffa certainly took exception to Keynes’s use of ‘own-rates’ as a synonym for marginal efficiencies, he did so, we believe, not because he found fault with the substance of Keynes’s analysis, rather because he disapproved of Keynes’s extension of use of the term ‘own-rate’ to the field of general asset choice and investment. Even though Sraffa was making what we would accept as a valid point - that Keynes would have been well advised to retain the conventional terminology - Keynes’s unorthodox extension of the concept of own-rates to cover yields on assets in general, questionable as it is, does not have any bearing on the validity of his *analysis* (nor, as we shall point out, did Sraffa think it had).

As to analytical confusion, there is no case for Keynes to answer. True, Keynes did alter his perspective and (later) his terminology when dealing with returns on money vis-à-vis other capital assets, but, apart from the isolated instance of an introductory example *a la* Sraffa of commodity trading, once the discussion was under way he used the terms ‘own-rates’ and ‘marginal efficiencies’ consistently to denote asset yields, the returns to asset holders, not costs to borrowers. Although he changed the terminology (from own-rates to marginal efficiencies) between 1936 and 1937 expositions of his theory of asset choice, this certainly did not indicate any confusion or admission of theoretical error on Keynes’s part – his theory of asset choice was not affected by the terminological change – reference to marginal efficiencies simply replaced references to own-rates with no change in meaning.

It was, so to say, *analytically* legitimate for Keynes to substitute marginal efficiencies for own-rates. Consider a simple illustration.

We suppose the spot ( $P_s$ ) and forward prices ( $P_f$ ) of a commodity ‘A’ (asset) to be, respectively £100 and £125 and that the rate of interest is 3%. In terms of Sraffa’s concept of the commodity rate as the cost of borrowing an asset, the cost (in terms of money) of holding A over one year =  $1 - P_f/P_s + r = £(100 - 125 + 3)/£100 = -£22/£100$  i.e. minus 22%. In other words, in terms of Keynes’s reading of Sraffa’s commodity rates as own-rates measuring the yield on holding an asset, the own-rate (in terms of money)<sup>17</sup> = plus 22%. Now, alternatively, represent the return on A as the

<sup>16</sup> Donzelli (2006, p.48) would agree with Sraffa that Keynes’s preferred terminology was inappropriate; he observes: ‘[T]he notion of the own rate of interest [*a la* Keynes] is wholly at variance with the notion of ‘futures’ commodity rates of interest, of Sraffian derivation. . . . the latter applies only to commodities proper and is crucially based on market variables (spot and futures commodity prices, money rate of interest); the former [as defined by Keynes] applies not only to commodities proper, but also to money and is based on variables ( $q, c, l$ ) whose nature is uncertain or obscure . . .’

<sup>17</sup> The value of the own-rate of A *in terms of itself* is arrived at by determining what quantity of A corresponds to the money cost (£22) of selling forward (‘investing in’) the given quantity of A for one year.

marginal efficiency of A. Initial investment (at time  $t$ ) = £100; interest charge = £3; value at completion of operation (time  $t+1$ ) = £(125 - 3) = £122. Marginal efficiency of capital (rate of discount which equates return, £122 ( $t+1$ ), to initial outlay, £100 ( $t$ ) = 22%. *QED*, the 'own-rate' and the 'marginal efficiency of capital' are alternative ways of describing the yield on an investment.

As regards the term 'marginal efficiency of capital' we note that Ranchetti himself seems to be confused about Sraffa's attitude. He says (Ranchetti, 2002, p.326) '... it is also clear that Sraffa could not accept Keynes' identification of his notion of commodity rate of interest (by Keynes dubbed as own-rate of interest) with the neoclassical notion of marginal efficiency'. But the adjective 'marginal' has no untoward significance as regards the calculation of an asset return by this method - it is not a reference to the 'marginal product of capital'. As we have just demonstrated, the return comes out at exactly the same value whether we call it the 'marginal efficiency of capital' or the 'own-rate' or, for that matter, the 'internal rate of return'. In fact Sraffa does not appear to have had a problem with 'marginal efficiency' as a way of describing the return on an asset; as Ranchetti himself reports, Sraffa indicated that in his opinion Keynes should have referred to marginal efficiencies rather than own-rates, and in the passage quoted above, in which Sraffa describes a deflationary situation in his own terms, he writes of the marginal efficiencies of money and other durable assets.

We conclude that while Keynes's use of the 'own-rates' terminology was open to criticism, and was indeed criticized by Sraffa, it was Keynes's mode of *presentation* that irked Sraffa; we have found no indication that Keynes's fundamental analysis was defective or that Sraffa believed it to be so. In fact, see below, Sraffa actually *endorses* the Keynes account of a depression situation, even while critical of Keynes's terminology.

(b) What do we make of Sraffa's statement that 'in the Keynesian case, the result on rates of interest is opposite to Keynes's conclusion'? Does that verdict, whatever it may at first sight seem to mean, imply (as the critics evidently suppose) rejection by Sraffa of Keynes's thesis that a high return on money may on occasion knock out investment in riskier capital goods?

For convenience, we yet again reproduce the critical passage by Sraffa which the commentators have seized upon:

What Keynes ought to have spoken of throughout (e.g p.229 top) is marg. efficiencies of various articles, and not their rates of interest. Then, if there is one article the marg. eff. of which never falls below 5% (this being the valuation of the pleasure people derive from holding any quantity of it) the production of all other durable assets will stop when their stocks are such that marginal efficiency has come down to that level – for otherwise they could not be sold at cost – and all resources saved will be used for producing the hoardable asset. If this asset cannot be produced (paper money), its demand will increase and can only be met by a continuous rise in its value, i.e. fall in general prices. If this hoarding is expected to go on steadily, and all prices are expected to fall in terms of money, the result will be that all own-rates of interest of commodities will be higher than the money rate (this is Fisher's case: the expected appreciation or depr. is the only possible cause of divergence in rates of interest).

Thus, in the Keynes case the result on rates of interest is opposite to Keynes's conclusion.

If that opening sentence is ignored – and both Ranchetti and Kurz omit it when they cite the passage - it is not altogether clear just what Sraffa is getting at. We have discussed Sraffa's dissatisfaction with Keynes's use of the 'own-rates' terminology. We now, *taking note of that first sentence*, interpret Sraffa's comment on Keynes's account of recessionary conditions in the light of that dissatisfaction. As we understand him, Sraffa is simply (and again) making the point that Keynes, in explaining his thesis that when the state of business confidence is low and wealth-holders prefer liquidity to investment in new capital goods, should have discussed investors' choice amongst assets in terms of their marginal efficiencies rather than their own-rates.

Sraffa is in fact in this passage being very specific about Keynes's usage. Sraffa's statement begins by echoing the passage from Chapter 17 in which (p.228) where - in the middle of a discussion conducted, up to, and after, that point in terms of asset own-rates – Keynes (arbitrarily) changes from referring to marginal efficiencies to speaking about own rates. Thus he starts his account:

As the stock of the assets, which began by having a marginal efficiency at least equal to the rate of interest, is increased, their marginal efficiency . . . tends to fall. Thus a point will come at which it no longer pays to produce them, *unless the rate of interest falls* *pari passu*. When there is no asset of which the marginal efficiency reaches the rate of interest, the further production of capital assets will come to a standstill.

If Keynes had conducted the general argument of Chapter 17, and the rest of this particular argument (pp.228-9), wholly in terms of the marginal efficiencies of the assets concerned<sup>18</sup> and had not, as he did in the middle of this discussion ('p.229 top'), switch to talking of the 'rates of interest' on money and other assets, Sraffa would certainly have been happier. Sraffa had no problem with the first part of Keynes's discussion (just quoted) expressed in terms of marginal efficiencies. That in fact is how Sraffa himself describes a deflationary downturn ('. . . if there is one article the marginal efficiency of which never falls below, say, 5% . . .'). But for Sraffa, the trouble is that Keynes, in the midst of the story (top of p.229) relapses into his favoured Chapter 17 usage, referring to own-rates rather than marginal efficiencies; thus:

it is that asset's rate of interest which declines most slowly as the stock of assets in general increases, and which eventually knocks out the profitable production of each of the others . . . As output increases, the own-rates of interest decline to levels at which one asset after another falls below the standard of profitable production; - until, finally one or more own-rates of interest remain at a level which is above that of the marginal efficiency of any asset whatever.

Sraffa, taking exception to that mode of presentation, tells the interest rate part of the Keynes story in what he considers the 'proper' terms. He states how, as he believes, the consequences of deflation ought to have been described by Keynes, interpreting own-rates as borrowing costs, and utilizing the term only with respect to changing commodity values.

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<sup>18</sup> Sraffa: 'What Keynes ought to have spoken of *throughout* (e.g. p.229 top) is marginal efficiencies . . .'

[There is occurring] a fall in general prices. If this hoarding is expected to go on steadily, and all prices are expected to fall in terms of money, the result will be that all own-rates of interest of commodities will be higher than the money rate (this is Fisher's case): the expected appreciation or depreciation is the only possible cause of divergence in rates of interest

And he notes that 'in the Keynes case the result on rates of interest is opposite to Keynes's conclusion' – because, of course, the Sraffa version of the story is told with asset returns expressed in terms of marginal efficiencies and 'own-rates' taken to mean the costs of forward selling in commodity trading.

In summary, Sraffa is pointing out (1) that, given a deflationary situation as described by Keynes, a conventional explanation of the downturn would run in terms of marginal efficiencies (rather than interest rates), with the *marginal efficiency of money* dominating the marginal efficiencies of other durable assets; and (2) that, with falling prices, the own-rates (conventionally defined) on all commodities would (the Fisher proposition) be *higher* than that on money.

Sraffa, that is to say, is explaining how he himself would have described what was happening in Keynes's 'money rules the roost' scenario. *The substance of the story is the same – only the language is different.* Sraffa might have said 'it is *the marginal efficiency of money as an asset* that 'rules the roost'. (At one point in his notes Sraffa actually comments, 'Restate K's theory in terms of marginal productivities instead of rates of interest.')

What we have here is a terminological, *not* a substantive, difference between the two theorists.

### **The Fisher case**

Finally, a word about the 'Fisher case' may be in order. When a continuous rise or fall in the price level is expected, the Fisher proposition comes into play, to the effect that the value of the rate of interest on money adjusts to maintain that rate at the real value it would have were prices constant. For example:

If  $r = 6\%$  when prices are stable, *ceteris paribus*, the nominal rate of interest will increase to 16% when a general rise in prices at 10% per annum is anticipated, and fall to 2% with deflation expected at a rate of 4%.

Sraffa's point therefore is that, when account is taken of the Fisher effect, with the onset of steady price deflation we would expect to find the rate of interest on money (nominal cost of borrowing) to be lower than it was when prices were stable. Furthermore, while money rate of interest is thus reduced, the own-rates (commodity-rates/costs of borrowing) on traded commodities would (*ceteris paribus*) be unaffected. Compare commodity rates before and after deflation sets in:

Continuing from the initial situation above of *stable* prices with  $r = 6\%$ , and as regards commodity  $x$ ,  $P_f = P_s$ , the own-rate on  $x = (1 - P_f/P_s + r) = 6\%$  (the same as the rate on money). Now suppose prices in general to be falling p.a. at 4%;  $r$  now = 2% and the rate on  $x = (1 - 96/100 + 2/100) = 6\%$ . Note that while the nominal rate on money has fallen from

6% to 2% with the occurrence of deflation at 4%, the own rate (cost of borrowing) on commodity x remains at 6%<sup>19</sup>.

Thus as Sraffa says with regard to the postulated deflationary situation, 'all own-rates of interest of commodities [are] higher than the money rate.

We can take the Fisher case illustration a stage further (at the expense of treading heavily on Sraffa's toes) by using the own-rate formulation to make a point not merely about own-rates in commodity trading, but more generally about asset returns.

Suppose the price of commodity x ( $P_x$ ) is expected to fall relative to other commodity prices ( $P_y$  and  $P_z$ ) by, say by 10%. If  $r = 6\%$ , and the price level is expected to remain unchanged, the own-rate on x =  $(1 - P_f/P_s + r) = (1 - 90/100 + 6/100) = 16\%$ . The own rates on y and z are both = 6%. What happens if, *ceteris paribus*, general deflation is expected (at 4% p.a.)? The money rate falls to 2%. The own-rate on x now =  $(1 - 86/100 + 2/100) = 16\%$ , and the whole own-rates on y and z also remain unchanged at  $(1 - 96/100 + 2/100) = 6\%$ . The disparity between the own rate on x and own-rates on assets is unaffected by deflation and the fall in the money rate of interest.

That example (now reading own-rates in Keynesian fashion as indicating asset yields) demonstrates that Keynes's result – the lower profitability of a capital asset reduces its own-rate relative to that on money – is unaffected by the implication of the Fisher proposition that, with deflation, the *nominal* rate on money falls relative to commodity (borrowing) rates. In our example, whether with constant prices or deflation, the yield on money – the value of its liquidity – is worth 6%; the yield on commodity or asset x is negative at minus 16%. As regards the Keynes theory of asset returns and asset choice, expressed *in effect* in terms of relative marginal efficiencies, the Fisher case is beside the point. Keynes's account of what happens with deflation still stands (albeit in the Keynesian language of which Sraffa strongly disapproved).

It will be appreciated that the remarks (as quoted above) by Sraffa on what he regarded as the proper description of the relationship between own-rates on money and on other assets/commodities have nothing whatever to do with the fundamental *logic or validity* of the theory of asset returns and asset choice developed by Keynes in the *General Theory*. We take the view that with respect to the Keynes theory the implication of Sraffa's remarks is merely that, in Sraffa's opinion, it is a pity that Keynes chose to present his analysis in the terms in which he did.

## Conclusion

We posed two questions: (1) of precisely what was Sraffa critical in commenting adversely on Keynes's use of own-rates? Was he rejecting the Keynes theory of asset choice in conditions of uncertainty, or was he merely complaining about the unorthodox mode of presentation favoured by Keynes? (2) does dissatisfaction expressed concerning Keynes's use of own-rates reveal any failings in Keynes's basic argument to the effect that (in his terminology), via the relationship of the own-rate on

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<sup>19</sup> We are here adopting Sraffa's preferred procedure of calculating the own-rate in terms of the commodity or asset itself by relating the money cost of the operation to the *spot* price. See Naldi (2010).

money to own-rates on other assets, liquidity preference may constrain investment spending to a level too low to support full employment?

We may end this long paper with a succinct conclusion. Our investigation has found nothing said either by Sraffa himself or by the critics which demonstrates analytical error on Keynes's part. Keynes's exposition was however presented in unorthodox and potentially confusing terms (which indeed appear to have confused the commentators), terms of which Sraffa was not enamoured. It is our conclusion that the strictures directed by Sraffa against Keynes's theorizing related to Keynes's chosen mode of exposition – rather than to the substance of his theory.

### **A couple of final thoughts**

(i) The critics take a very negative view of Keynes's Chapter 17 – but they have virtually nothing to say about what they would put in its place. All we can find is the following – suggesting a return to a pre-Keynesian perspective: 'Keynes's liquidity preference theory [Sraffa concluded] – which Sraffa called 'Keynes's System' - could not bear the brunt of the explanation of a downward rigidity of the interest rate. Yet if the interest rate were flexible and if investment was sufficiently elastic with respect to the rate of interest, then there was no reason to presume that investment could not gravitate towards a level equal to full employment saving'. (Kurz, 2012, p.50).

(ii) Do the critics think it plausible that Sraffa, if he had – as they imply - come to question the whole theoretical edifice of the *General Theory*, would not (discreetly) have made his doubts known to Keynes?

## Appendix 1: Oka's defence of Keynes

T Oka (2010), 'How Can Keynes's Theory of Interest Withstand Sraffa's Criticism?'

Oka's seems to be the only paper which attempts to defend Keynes against the recent criticism that, having borrowed the own-rate concept from Sraffa, he fails to use it satisfactorily.

Oka claims it is possible to demonstrate that Keynes's theory 'can withstand Sraffa's criticism'. He attempts to do so by directing attention to a Keynesian situation of (unemployment) equilibrium with deflation. The return on the marginal investment project would just equal the rate of interest. That seems plausible. With the return at the margin  $(q - c + a) = r$ , it follows that, as 'a' is negative on account of on-going deflation,  $(q - c)$  must exceed  $r$ . Oka seems to believe that this equilibrium situation combines what Sraffa had in mind – an asset own-rate (in terms of itself) greater than the rate on money, with the Keynesian condition of equilibrium - that the asset own-rate (in terms of money), equals the rate of interest on money. That, if we read him correctly, seems to be Oka's defence of Keynes: that the Keynesian analysis is thus compatible with the Sraffa scenario.

Oka seems not to have realized, however, that Sraffa was describing a situation in which the own-rate on money – interpreted as the cost of borrowing money - was less than asset own-rates, again understood as borrowing costs, or alternatively, a situation in which the yield on money exceeds the yield on alternative assets. This is in fact the 'opposite' of the Oka (supposedly Sraffa) situation in which the yield on money is less than the asset yield.

Our verdict therefore is that, although Oka's paper seems scholarly and well-informed, he has missed the fundamental point that the seeming conflict of views between Sraffa and Keynes as to the behaviour of interest rates when prices are falling is more apparent than real, arising as it does out of different perspectives on the matters at issue.

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