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ALFRED MARSHALL ON THE THEORY OF CAPITAL

1. Alfred Marshall is commonly considered one of the great British economists of the late-Victorian period, together with Jevons and Edgeworth. Perhaps the greatest of them, if one rates grand theoretical syntheses higher than single analytical achievements. It is therefore surprising to notice that in most historical studies on the theory of capital, Marshall is not mentioned as a contributor to the subject[1]. A widely spread opinion, traceable back to Schumpeter and recently corroborated by Christopher Bliss[2], takes for certain that Marshall did not hold a coherently organized theory of capital because his partial-equilibrium approach was intrinsically unfit for dealing properly with "the general equilibrium question par excellence". This is a biased position, which underlines the difficulties due to the presence of market interrelations, but disregards those connected with the dynamic nature of the problem. By preventing an examiner of Marshall's theory of capital from evaluating it on its own premises, it is a position which leads ultimately to a purely external criticism.

This paper provides a different critical assessment of Marshall's theory of capital, paying attention to the specific questions it was meant to answer. They had nothing to do with the study of market interrelations. Marshall's purpose was to lay the foundations of a comprehensive theory of production, value and distribution, built along partial-equilibrium lines, implying the assumption of organized but isolated markets.

It is undeniable that the treatment of the subject by Marshall was not free from a certain amount of ambiguity. One reason for it, I think, is that he held a number of different notions of capital, which he did not coherently connect together.

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[1] See, for instance, P. Garegnani, Il capitale nelle teorie della distribuzione, Giuffrè, Milano, 1960; R.M. Solow, Capital Theory and the Rate of Return, North-Holland, Amsterdam, 1963; D. Dewey, Modern Capital Theory, Columbia Univ. Press, New York, 1965; C. Bliss, Capital Theory and the Distribution of Income, North-Holland, Amsterdam, 1975; J.A. Kregel, Theory of Capital, Macmillan, London, 1976.

[2] See Schumpeter, 1954, pp. 837-38, and Bliss, 1990, pp. 225-26. Bliss describes Marshall's theory of capital as a "rather superficial treatment of a deep problem" (*ibidem*, p. 227).

Capital was first considered by Marshall as a fund of productive advances to labour; then as a specific agent of production (in a set of three and later of four distinct factors); finally as a generic source of income. With the possible exception of the first notion, later abandoned, Marshall did not refer to these concepts of capital as alternative to each other. He simply kept all of them, but he did not explain how they could be reconciled.

The uninitiated readers of Marshall's writings may therefore get the impression of either an inaccurate treatment of the subject, which they would certainly not expect by an author of Marshall's reputation, or a subtle attempt to question the centrality of the analytical role assigned to capital by classical economists, in a rather unusual way, showing that the notion of capital could be given a wide range of different meanings.

Interest too was defined by Marshall in a number of ways: as the supply price of capital, the demand price for saving, the price paid for the use of capital, the payment made by a borrower to a lender for the use of a money loan, the reward for waiting, the earnings of capital, the net income derived from a new investment. Again, there is a need of clarification. Was interest, for Marshall, a monetary or a real variable? The return to a financial investment, or the return to a real investment? And how were these returns related to each other and to the whole price system? Marshall's answers to these questions were scattered in various passages of his works, so that it takes some effort to find them out and to bring them together into a whole.

In my opinion, Marshall's theory of capital was designed to serve two main purposes. The first and most important was to contribute to the integration of the theory of income distribution into a general theory of value. This aim - perhaps the most significant task which economic theorists were undertaking at those times - was pursued by Marshall in the purest efficiency perspective. Each type of income was considered as the proper reward paid in a market economy for the service of a specific agent of production. The result was a view of the distribution of income as endogenously determined by the price mechanism, namely by its setting of the exchange conditions for factor services. As any other factor, capital would be used up to the point where the value of its marginal product, subject to diminishing returns, equaled its marginal cost. Competition would ensure in the long-period a tendency of the demand-price for capital to equal the supply-price, determined by its real cost of production.

In view of the fact that the traditional definition of capital as a homogeneous factor of production was logically suited for this purpose, Marshall seemed to rely at least partially on it. He spoke of "the general fund of capital as the product of

labour and waiting", a definition which implied genetic homogeneity, though not necessarily physical homogeneity. He also retained the classical explanation for the return to capital in the long-run. But he did not stop there.

Marshall's reasons for this attitude were fairly clear. He assigned to the theory of capital a second and entirely different role, besides that of contributing to the linkage of the theory of distribution with the theory of value. It was the closing of the conceptual and terminological gap between economic theory and business practice. This implied, in his view, the need to adapt a number of economic concepts, including capital, to the ordinary language of the market-place, which "commonly regards a man's capital as that part of his wealth which he devotes to acquiring an income in the form of money"[3]. Capital had therefore to be redefined as a generic source of income, different from labour and land but almost undistinguishable from wealth.

The business practice ascribed a capital value to any kind of wealth, quite independently of its productive or unproductive uses, simply as a property which could be sold for money in the market. Capital and wealth were therefore regarded by business men as stocks of income-earning things, consisting in the main of the same goods. In the Marshallian theory this was no longer possible. Capital had to be distinguished from wealth, if it was going to be treated as a specialized factor of production, earning a specific income.

In Marshall's opinion, the economist's definition of capital as a specialized factor of production was not inconsistent with the business man's notion of capital as generic income-earning power. He realized, however, that the business man's wider notion of capital, which included any material source of income, led to the logical conclusion that capital was the only factor of production other than labour. Such a conclusion could not meet the needs of his theory of production and distribution. Pre-analytical reasons urged Marshall to recognize the existence of more than two distinct factors, capital and labour, which otherwise would necessarily appear as natural antagonists in the distribution of the social product. This was a state of things that Marshall, strongly concerned with British industrial relations, was not willing to suggest. He thought that an economist open to social problems was fully entitled to mediate social conflicts and bring them to an end[4]. As a result, he redefined capital so as to keep

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[3] Marshall, 1890, 8th rev. ed., p. 60.

[4] On this point, see M. Dardi, Alfred Marshall e le relazioni industriali, "Quaderni di Storia dell'Economia Politica", 1983, n. 1, pp. 121-64.

its strict relation with income but to allow for the existence of more than two factors of production. It was indeed the third factor, characterized in the negative, as a source of income *other than* land and labour: "all things other than land, which yield income that is generally reckoned as such in common discourse"[5].

Appearently, the solution met Marshall's needs. It saved the correlation of capital with income and kept the means of production supplied by nature and those made by man separate. Individual capital became an empty box, ready to be filled with everything could give "incomings", i.e. benefits or payments, in the form of money or in kind. Social capital, on the contrary, remained a factor contributing to the formation of the "national dividend"; though not the only factor other than labour. It was an awkward piece of theory, but Marshall found that it was "well adapted for the main purposes of the economist"[6].

2. An entire chapter of the *Principles* - Chapter IV, in Book II - was devoted by Marshall to a parallel definition and illustration of the correlative concepts of capital and income. His theory covered both social and individual capital. The former was the notion of "capital in general", traditionally used by political economists, concerned with the community as a whole. As a real fund of productive anticipations to labour, it did not include land and money balances[7]. Its logical complement was the notion of capital from an individual point of view, namely that part of personal wealth devoted to the acquisition of an income in the form of money. It included rights to land and money balances. In the third edition of the *Principles*, it was named "trade capital" and defined as "those external goods which a person uses in his trade, either holding them to be sold for money or applying them to produce things that are to be sold for money"[8].

According to Marshall, the introduction of the concept of trade capital corresponded to what had been *de facto* his main use

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[5] Marshall, 1890, 8th rev. ed., p. 66.

[6] Marshall, 1892, 3rd ed., repr. 1932, p. 47.

[7] In Ricardo's words, it was "that part of the wealth of a country which is employed in production, and consists of food, clothing, tools, raw materials, machinery, etc., necessary to give effect to labour". The definition is given at the beginning of Chapter V (*On Wages*) of the *Principles*. Smith's definition in the *Wealth of Nations* (Book II, Chapter I) linked the stock of capital to an expected income flow and included money in the notion of individual circulating capital, as disposable purchasing power.

[8] Marshall, 1890, 8th rev. ed., p. 60.

of the term "capital" and did not imply a change of perspective, since a notion of individual or business capital was already firmly established in the ordinary usage. But the change of analytical perspective was quite evident. The Marshallian notion of trade capital represented an important departure from the classical concept of productive capital, in a post-classical, Millian direction[9]. It shifted the attention away from a real notion of capital - that of produced means of production - towards a conventional concept which embraced anything with a realizable "capital value", including the goodwill of a business.

There was, therefore, a degrading of theoretical standing: the giving up of a substantive concept in favour of a purely nominal one, almost undistinguishable from that of reproducible wealth. It was the price which had to be paid for a broader notion of capital, having no definite real or monetary content and suitable for a wide range of different, uncharacterizing uses[10]. Marshall was conscious of this point and willing to pay such a price. In a letter to Edwin Cannan, he frankly admitted that "trade capital" was an expression which recalled the ordinary meaning of the term in the business language, but had "no scientific justification"[11].

Did Marshall contribute by this use of the word "capital" to accomplish the "betrayal of the classical tradition", the "subversion of classical analysis", which neoricardian and marxian critics have later ascribed to him, on more general grounds?[12] In my opinion, he was pursuing knowledge for its own sake and had no intention to set himself in opposition to the received doctrine. He was simply looking for a comprehensive concept of capital,

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[9] According to J.S. Mill, "Capital, strictly speaking, has no productive power. The only productive power is that of labour; assisted, no doubt, by tools and acting upon materials... The proper view of capital is that anything whatever, which a person possesses, constitutes his capital, provided he is able, and intends, to employ it, not in consumption for the purpose of enjoyment, but in possessing himself of the means of production, with the intention of employing those means productively" (On Profit and Interest, 1830, in Essays on Some Unsettled Questions in Political Economy, London, 1844, and in Collected Works, ed. by J.M. Robson, Univ. of Toronto Press, Toronto, and Routledge and Kegan, London, 1965-81, vol. IV, 1967, p. 290). This early view was later corroborated in Mill's Principles of Political Economy (C.W., vol. II, 1965, pp. 64-65).

[10] For a similar interpretation, see Dardi, 1984, pp. 216-17, who points out the abandonment of a "founding" concept of capital for one of purely "accessory" character.

[11] In a letter dated Jan. 7, 1898. See Marshall, 1925, p. 404.

[12] See G. Lunghini, 1977, pp. 11-12, and Bharadwaj, 1978 (even in the title).

specifically addressed to the construction of a business science. In so doing, he certainly departed on several points from the Ricardian tradition.

One of them was the question of capital measurement. As most capital theorists of his times, he took for granted that the measurement of a heterogeneous stock of capital could be properly done in terms of money, by reckoning the discounted market values of the expected net quasi-rents of capital assets, without realizing that this type of measurement implied a circular reasoning, because it sent back to an implausible price system determined independently of the rate of profit and the amount of capital. He knew that either technical or value homogeneity of capital were required to compute the marginal products of factors of production and to reckon the rate of profit as a proportion of the total amount of capital invested. Marshall's keen sense of realism prevented him from accepting the fiction of technical homogeneity of capital. He was therefore forced to rely upon the alternative option of measuring capital in homogeneous value terms.

3. To avoid the risk of a terminological confusion between capital and wealth, implicit in the notion of trade capital, Marshall proposed to revive an old criterion of demarcation:

> "There is a clear tradition that we should speak of Capital when considering things as agents of production; and we should speak of Wealth when considering them as results of production, as subjects of consumption and as yielding pleasures of possession"[13].

Capital became "the main stock of wealth regarded as an agent of production rather than as a direct source of gratification"[14].

It was a doubtful criterion, of a purely conventional nature: the same things were described as capital or wealth, according not to their nature but to the way one was looking at them. However, since a criterion was needed, that one - suggested by a balance of usage and convenience - was ultimately adopted by Marshall.

Unfortunately, Marshall's taste for conservatism of the received body of knowledge was so marked to induce him to allow for some exceptions to his own criterion. To comply with the established tradition that regarded as capital any asset which yielded a flow of services over time, he retained the ambiguous concept of "consumption capital", i.e. of "goods in a form to

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[13] Marshall, 1890, 8th rev. ed., p. 68.

[14] *Ibidem*, p. 115.

satisfy wants directly". It was a notion close to the classical concept of "wage capital", consisting of those things which support labour in production[15]. Marshall contrasted it to "auxiliary, or instrumental, capital", a collection of tangible, intermediate goods of different shape, quality and age, which aid labour in production but do not support it[16], also called "productive", "technical" or "material capital"[17]. Together, they led Marshall to a new and comprehensive definition of capital as "those things which *aid or support* labour in production"[18]. But he emphasized their difference with some hesitation, probably conscious of the fact that their distinction violated his line of demarcation between capital and wealth[19].

In *The Economics of Industry*, pointing out the relevance of the above distinction for his critique of the wages-fund theory, Marshall remarked that some economists "called the Remuneratory capital in the country its 'Wages-Fund'; and they argued that no change could increase this Fund, unless it either increased the total amount of capital in the country, or caused the Remuneratory capital to increase at the expense of the Auxiliary". And in a footnote he added that "a fall in the rate of interest increases the use of machinery and other fixed capital, and therefore tends to increase Auxiliary capital relatively to Remuneratory. But the exponents of the Wages-Fund Theory seem generally to have overlooked this argument...[20]". Their theory was false, because "it suggested a correlation between the *stock* of capital and the *flow* of wages, instead of the true correlation between the *flow* of the products of labour aided by capital and the flow of wages"[21].

Internal to the category of auxiliary or instrumental capital was a further terminological distinction: the old one between "circulating capital", which consumes itself in a single use, and

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15 *Ibidem*, p. 649.

16 *Ibidem*, pp. 63 e 650.

17 *Ibidem*, p. 433.

18 *Ibidem*, p. 649.

19 Reporting the distinction between consumption capital and instrumental capital, Marshall expressed his hesitation by noting that "no clear distinction can be drawn between the two classes" and that "where definiteness is necessary, the terms should be avoided; and explicit enumerations should be given" (*Ibidem*, p. 63).

20 Marshall, 1879, 2nd ed., repr. 1888, pp. 203 and 204 n.

21 Marshall, 1890, 8th rev. ed., p. 452.

durable" or "fixed capital", suitable of repeated uses within a certain period of time[22]. When capital is regarded as a fund of wages anticipations, as Marshall initially did in the Seventies, this distinction is not truly essential; it concerns a difference of grade in the length of the period during which capital is anticipated[23]. But the distinction involves a fundamental difference of quality whenever capital is considered as embodied productive power, rather than wage anticipations. Such was the "younger economists'" perspective which Marshall adopted in the Eighties, when he passed from an "anticipation" view, emphasizing time-lags in production, to a "synchronization" view, implying the payment of current outlays out of current revenues[24]; or from a "fundist" conception of real capital, classically conceived as a revolving fund of values, temporarily embodied in the physical form of productive advances to labour, to a "materialist" view of capital as physical assets, identifiable independently of their values[25].

A third distinction retained by Marshall dealt with the difference between a fund of money capital and a stock of real capital. Both notions were quite old ones. Money capital was a pre-classical notion, strictly linked with capital loans; real capital a classical concept, which sent back a definite group of commodities and to the idea of embodied, accumulated labour. Borrowing from Jevons[26], Marshall contrasted "free" or "floating" capital, in the form of money funds available for loans or for new investments, with "specialized", or "sunk" capital, invested in material means of production. But it was not a simple repetition. In the Jevonian theory, free capital was a real notion: the collection of consumption goods required to sustain labour in a

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[22] Marshall, *ibidem*, p. 63, and 1975, I, pp. 220-22 (the first of Four Fragments on Fixed Capital).

[23] The distinction between durable and non durable capital adds to formal complications, whenever the cost of production of a commodity has to be expressed in terms of the rental prices of the capital goods used to produce it.

[24] For the terminology, see J.A. Schumpeter, 1954.

[25] On the "fundist" and "materialist" conceptions of real capital, see J. Hicks, Capital Controversies: Ancient and Modern, "American Economic Review", Papers and Proceedings, May 1974, pp. 307-16. In Marshall's own words, the passage was from the older approach to the problem, which regarded the demand for labour as a function of the funds previously accumulated for that purpose, to the "modern doctrines" which, "instead of treating capital as hiring labour,... treated them as mutually finding employment and remuneration for one another" (Marshall, Distribution and Exchange, "Economic Journal", vol. 8, repr. in Marshall, 1961, II, p, 233).

[26] See Jevons, 1871, p. 311-12.

time-consuming production process. In Marshall's writings it became "a stock of one particular thing, money"[27], a financial concept which made sense only from an individual point of view[28]. No longer real productive power, but simple power of disposition over it, "command over goods to a given money value", suitable to change as a result of price movements, independently of any change in the techniques of production or in the productivity of factors. There was, again, a passage from a real notion of capital to one of purely conventional nature: that of loanable funds.

The last distinction was particularly important for its distributive implications. In Marshall's opinion, two different types of income corresponded to free and invested capital. Free capital was rewarded by an interest, sunk capital by a quasi-rent. Their difference was of degree, rather than nature:

> "When the free capital has been invested in a particular thing, its money value cannot as a rule be ascertained except by capitalizing the net income which it will yield: and therefore the causes which govern it are likely to be akin in a greater or less degree to those which govern rents... There is no sharp line of division between floating capital and that which has invested for a special branch of production, nor between new and old investments of capital; each group shades into the other gradually"[29].

The rationale of the Marshallian "doctrine of the shading groups" was extremely simple: when a stock of capital was free to move, it could only gain an interest, no matter how long was the period concerned; when it was temporarily fixed (for short periods, within which it had to be regarded as given and scarce, like natural resources), it was rewarded by a profit, or a quasi-rent; when it was permanently fixed, it was entitled to get a rent, "the leading species of a large genus"[30], which applied to any permanently scarce and non-reproducible stock. Marshall thought

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[27] Marshall, 1890, 8th rev. ed., p. 62. Eshag's interpretation of Marshall's "free" capital as "real resources which were not committed to any particular use and were, therefore, available for investment in a variety of business projects" (Eshag, 1963, p. 46) is groundless. Free capital was for Marshall a money variable. The fact that it could be expressed in terms of stable money did not imply a real nature.

[28] From the social point of view, it is doubtful whether money has to be considered as capital, since it represents both a claim (for the owner) and an obligation (for the issuer), two entities which cancel each other out at a national level, in a closed economy.

[29] Marshall, 1890, 8th rev. ed., p. vii of the Preface and pp. 341-42.

[30] *Ibidem*, p. 342 and 350.

that no fundamental difference in quality could be found in the incomes of factors of production other than labour, as they gradually shaded into each other when the time dimension of the analysis was allowed to vary. His conception was coherent with the idea that "most of the chief distinctions marked by economic terms are differences not of kind but of degree"[31].

4. Since neither the notion of social capital nor that of trade capital referred to a homogeneus productive substance, Marshall's decision to treat capital as a specific factor of production represented no more than a tribute generously paid to a long standing tradition. Strictly speaking, it was inconsistent with his general views on the subject. Marshall was probably conscious of this logical difficulty. "In a sense" - he noticed - "there are only two agents of production, nature and man. Capital and organization are the result of the work of man aided by nature"[32].

In the early Marshallian manuscripts of the Seventies, production was represented in a classical manner, as a continuous sequence of anticipation and reconstitution cycles, where all material inputs were outputs of a previous productive cycle. Capital was regarded both as a result and as an agent of production. Its nature changed according to the role performed. As a result of production, it was treated as a flow, being part of the social output originated in the period. As an agent of production, on the contrary, it was the stock of productive means in existence at the beginning of the period. The attribution of such a dichotomic dimension to capital could not be logically sustained. It called for an abandonment of the wages-fund doctrine in favour of a synchronised view of the time structure of production.

For the young Marshall, the aggregate size and the composition of capital were the determinants of the total amount of labour employed in the economy. In one of his early manuscripts, the essay *On Wages*[33] - where he applied his period-classification and his moving equilibrium method to the study of the effects of wage changes on the distribution of income and the accumulation of capital - he seemed to accept the four Millian fundamental propositions on capital, including the last one, according to which "demand for commodities is not demand for

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[31] *Ibidem*, p. 43.

[32] *Ibidem*, p. 116.

[33] Marshall, 1975, I, pp. 184-201.

labour". The demand for labour was assumed to depend on the size of accumulated capital. But Marshall's acceptance of the controversial Millian proposition was only apparent. He considered the demand for labour as a function of both the fund of previously accumulated capital and the productivity of labour, a variable which he regarded as positively related to the wage level. The Millian wages-fund was deprived of its most essential distinctive feature: that of being at any instant of time a fixed entity. As time was allowed to pass, the given fund could be augmented by current savings, or diminished by current expenditures. The dimensional nature of capital, for the young Marshall, was therefore that of a "stock-augmentable" variable inclusive of the old stock and the new flow, a compromising solution made possible by his moving equilibrium approach.

In the middle Eighties, reconsidering the relationship between capital and labour in production in the light of new empirical data, Marshall reached a more critical attitude towards the anticipation view. The dependence of labour employment on the total stock of capital available in the economy was no longer evident in a world where wages were paid out of current incomes after work had been done, instead of being anticipated by capitalists. Relieved from the link with a wage-anticipation scheme, the theory of capital could then proceed in a different direction, along marginal productivity lines, as suggested long before by Longfield and von Thünen. A new theory of income distribution was however needed for this purpose.

5. An outline of Marshall's theory of income distribution - his doctrine of the division of the national dividend into factor shares - was first sketched in 1872 in his review of Jevons' *Theory of Political Economy*[34]. One of the questions Marshall raised there concerned the correctness of Jevons' assertion that wages are ultimately equal to the product of labour after deduction of rent, interest and taxes. Marshall's objection was that "since rent, taxes, etc. are not paid in kind, we must have before us a complete theory of value in order that we may perform this subtraction"[35]. According to Marshall, Jevons had not seen that the amount of wages and the exchange value of the products were mutually dependent. He had erroneously taken the value of the

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[34] The review ("Academy", April 1, 1872, repr. in Marshall, 1925, pp. 93-99) was the first work ever published by Marshall. Though critical of Jevons' utilitarian approach, Marshall was sympathetic with his marginal productivity treatment of the demand for capital.

[35] *Ibidem*, p. 94.

products as independently determined, prior to wages. Marshall's comment to Jevons' theory was that:

> "It is right and necessary to break up the problem; to neglect for the time the influence of some elements; to investigate the variations of any one element which must, *caeteris paribus*, accompany certain assumed variations in one or more others... But this does not justify us in speaking, in general, of one element as determined by another; as, for instance, of value as determined by cost of production, or of wages as determined by value"[36].

Marshall's critique of Jevons' theory of income distribution was therefore based on the "Walrasian" idea of a mutual dependence of all economic variables. In his first published work, Marshall took care to point out unequivocally that he could not conceive the theory of capital as separate from a general theory of value.

Seven years later, the main lines of the Marshallian theory of distribution were developed in Book II and III of *The Economics of Industry*. The aggregate amount of wages, interests and profits on capital was treated as an *earnings-and-interest fund* (or *wages-and-profits fund*), a residual of the net social output flow of the economy, after deduction of rents, an independently determined income category. "Earnings" meant wages and salaries, including those for managerial activity. "Interest" was the name given to any income from capital, and included profits. The allocation of the earnings-and-interest fund between wages and profits was settled by rewarding capital and labour symmetrically, in the short-period according to their marginal productivities and in the long-period according to their normal values.

It was one of the most significant achievements of Marshall's process of critical reassessment of the classical theory: the passage from the "old view" of capital as wage advances to labour to the "new view" of capital as a specific productive factor. "The most important divergence from the newer to the older doctrines" was "that instead of treating capital as hiring labour, modern doctrines treated them as mutually finding employment and remuneration for one another".

As noticed by Whitaker, "the chief significance of the distribution theory of the *Economics of Industry* lies in its clear evidence that Marshall had broken free from the straight-jacket of the wages fund, and had come to regard output as the common source from which the capital and labour employed in producing it receive net returns, rather than the source from which capital receives a gross return to remunerate and refund its wage advances"[37]. The 1879

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[36] *Ibidem*, p. 95.

[37] Whitaker, 1975, I, p. 81.

little book gave clear evidence of Marshall's passage from the anticipation to the synchronization view.

Though the terminology used by Marshall, still reminiscent in the chapter on capital of the wage-fund language, disclosed his concern about formal continuity with the classical theory, his view of the distributive process represented in the whole a significant innovation with respect to the Millian tradition, where wages - not rents - were the independent variable.

An element of confusion was, however, inherent in the fact that dealing with normal values, in Book II, Marshall chose to classify profits together with wages, as earnings obeying the same laws of distribution; whereas dealing with market values, in Book III, he followed the prevailing practice and assimilated profits to interests on capital.

Later on, in 1887 and 1888 - in two articles in *The Quarterly Journal of Economics* on the theory of business profits and on wages and profits, answering some criticisms by Walker and McVane[38] - Marshall passed to a different theory of income distribution, where each type of income was considered as the reward for the services rendered by a distinct agent of production. Interests were linked to "fluid" capital; entrepreneurial profits to "organization" or "management"; wages to labour; and rents to land and scarce natural resources. Due to the separate consideration of interests and profits, there were four distinct categories of factors of production, instead of three. The whole theory rested upon the "doctrine of the shading groups", already mentioned.

The latter approach to the theory of income distribution, retained in the *Principles*, was not free from problems, because business profits were considered at one and the same time as the independently determined reward for a distinct factor, managerial capacity, and as a residual income category, consisting in the excess of total revenues over total outlays, gross of normal profits. The result was a theory of income distribution of unsolved nature, where a dominant additive character contrasted with the presence of a residual component.

Another important source of logical difficulty in the Marshallian theory of capital was his definition of interest as "the reward for waiting". A definition which recalled the "old view" of production as a time-consuming activity requiring preexistent stocks of materials and advances to labour. Clearly, it had little to do with the idea of the rental price received or

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[38] A. Marshall, The Theory of Business Profits, "Quarterly Journal of Economics", vol. 1, July 1887, pp. 477-81, and Wages and Profits, *ibidem*, vol. 2, January 1888, pp. 218-23, both repr. in Marshall, 1961, vol. 2.

paid for the services of a specific agent of production.

The confusion on the nature of interest is further increased by Marshall's remark that the this term, besides being employed in its proper meaning of a payment made by a borrower to a lender for the use of a loan, was "also used more broadly to represent the money equivalent of the whole income which is derived from capital"[39]. In other words, to represent all "the earnings of capital"[40]: not only those of free capital, but those of invested capital as well, which "is properly a quasi-rent and can be regarded as interest only on the assumption that the capital value of the investment has remained unaltered"[41]. "Whenever this is done" - Marshall noticed - "the capital must not be regarded as a stock of things in general. It must be regarded as a stock of one particular thing, money, which is taken to represent them"[42]. An unfortunate statement, which contributed to the confusion between interest and profit out of general equilibrium conditions, when any real or financial investment is expected to yield a uniform rate of net return to capital. In order to call "interest" any income derived from investment, capital has to be considered as the only agent of production.

Marshall's view of income distribution suffered, therefore, the same structural weakness that characterized his theory of capital. There was too much in it: an additive theory, a deductive theory, even an independent theory of interest. The flexible organizing principle underlying the Marshallian theory of distribution, expressed by his "doctrine of the shading groups", failed to establish clearly which was which, in a domain where accuracy is essential.

6. Let us now consider the way Marshall faced the fundamental question of why capital has a value which entitles his owner to receive an interest. Because of its productivity (or spendability, in the case of money capital), or because of the sacrifice required by its accumulation? Marshall's answer was a clear-cut one: because of both of them. He did not think that the problem involved a choice between alternative positions. In his demand-and-supply explanation of the interest rate, everything was granted a role: productiveness and prospectiveness, efforts and

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[39] Marshall, 1890, 8th rev. ed., p. 61.

[40] *Ibidem*, p. 488.

[41] *Ibidem*, p. 443.

[42] *Ibidem*, p. 62.

waitings, real and subjective costs.

Interest was the rental-price of capital, a factor of production. As any other price of a factor service, the equilibrium level of the rate of interest was established by the principle of substitution at the margin. It implied equality between the utility of a further unit of money directly spent in consumption goods and the present value of the utility expected in the future by investing the same unit of money in capital goods. Together, these basic options exhausted the demand for transaction balances at any level of income. The total demand for cash balances resulted from the sum of two distinct components: the transaction demand made for convenience motives and the precautionary or speculative demand induced by the expectation of a change in prices.

Marshall could not find any substantial difference between the reasons of convenience which induced people to demand individual commodities and money. Both demands were the result of the same "balancing of advantages":

> "This then is the balancing of advantages which each individual has to adjust for himself. If he retains but a very small ready command over commodities he is likely to be put occasionally to a considerable inconvenience; if he retains a very large one he receives no adequate compensation for the inaction to which so much of his wealth is doomed. He has then to settle what is the exact amount which on the average it will answer his purpose to keep in this ready form. Each individual settles this and therefore the whole amount retained in this form by the community is determined by this process on the part of each individual member of it of balancing opposing advantages"[43].

The transaction demand for money was formally treated by Marshall as a function of the level of income. The interest rate did not appear in the right-hand side of the Cambridge equation. The insertion of the rate of interest as a further explanatory variable in the Marshallian function of the demand for money was however required to account for possible alternative uses of the cash balances. A third set of opportunities had thus to be considered: that of holding securities or other financial assets earning a money benefit, a "reward for waiting". Marshall did it by extending the investment option, to include a further margin of choice, between real and financial investment[44].

The principle of substitution at the margin, which ensures

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[43] From the early Essay on Money (See Marshall, 1975, I, p. 167).

[44] Marshall, 1926 (1899), pp. 267-68.

the balancing of alternative advantages, takes, in Marshall's treatment of the subject, the same "threefold-margin" form that can be found in the neoclassical efficiency conditions independently established first by Walras and later by Fisher. In the Walrasian system, the marginal conditions of convenience imply equality between relative prices and technical and subjective transformation rates. In the Fisherian system, the corresponding static equilibrium conditions require simultaneous equality of the rate of interest, the rate of subjective time preference and the social rate of return on investment (Fisher's rate of return over cost). These sets of conditions amount to the same thing in the limit-case of a stationary economy.

The use Marshall made of the principle of substitution at the margin, to show that "there is some distribution of resources between various expenditures which yields a better result than any other"[45] is a reason to believe that he shared the Keynesian idea of a central role of the rate of interest in the process of resource allocation. He thought that there were obvious motives of convenience, security and speculation[46] which might induce a wealth owner to hold money balances. However, at any moment, they had to be compared with two alternative options: that of spending money in consumption goods, to get an immediate satisfaction of present wants, and that of investing money in real or financial assets, in the hope to obtain in the future a profit or to get an interest. Since the option of investing was itself open to the choice between real and financial assets, Marshall was actually referring to a fourfold-margin of convenience:

> "...currency held in hand yields no income: therefore everyone balances (more or less automatically and instinctively) the benefits, which he would get by enlarging his stock of currency in the hand, against those which he would get by investing some of it either in a commodity... from which he would derive a direct benefit; or in some business plant or stock exchange security, which would yield him a money income[47]".

As noticed by Eshag, the idea that holding idle cash balances rather than financial assets implies an opportunity cost measured

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[45] Marshall, 1890, 8th rev. ed., p. 141.

[46] A speculative motive for holding money was, in Marshall's opinion, basic for the working of his "law of hoarding" (the tendency to buy or sell, or to make arbitrages, on the expectation of "favourable terms"). See Marshall, 1923, pp. 227-28, as well as an unpublished manuscript on The Folly of Amateur Speculation (dated August 16, 1904), mentioned by M. Dardi e M. Gallegati, 1989, pp. 46-48.

[47] Marshall, 1923, pp. 38-39.

by the rate of interest ruling in the market was not a new one[48]. But Marshall had the merit of linking this old and obvious proposition to a general criterion of convenience - the principle of substitution and balancing of advantages at the margin - suitable to be applied to any choice between alternative options. In this way, he was able both to establish one of the basic concepts of his theory of capital and to reconnect the separate chapter of capital theory with the main body of economics. By recognizing the fact that having more of a specific asset involves having less of some other one, Marshall's approach to the problem made possible a coherent insertion of the theory of capital into the general neoclassical framework of the theory of choice in the face of scarcity.

7. Did the Marshallian theory of capital, so conceived, represent an advance with respect to the classical vision of the problem? Judged from a practical point of view, for its realism and its capacity to pay attention to fundamentals, probably it did not. But considered from the point of view of its relevance for a greater integration of separate chapters of economic science - value and distribution, real and monetary theory - it certainly did. A major Marshallian achievement in this field was indeed the granting of permanent roles in the general theory of value to factor rewards and the real quantity of money.

The classical treatment of capital as a changing collection of intermediate goods - having genetic resemblance for being the product of past labour, but differing in shape, age and efficiency - could not lead to the construction of a separate chapter of economic theory. Genetic similarity could not balance the lack of physical and technical homogeneity. The scope for a "pure" theory occurred only later, when capital - spoiled of its material attributes and reduced to abstract productive power - began to be considered a distinct homogeneous factor, a fact which opened the way to the search of an equilibrium point in the "price-quantity space" of capital.

"Pure capital" - the central element of a doctrine advanced in the United States by John Bates Clark and later implemented by two other American economists, Irving Fisher and Frank Knight - was a permanent fund of abstract productive power, capable of maintaining over time its nature of a store of wealth, while continuously changing its physical form. It recalled the stationary but moving mass of a waterfall, made up of an infinitely large number of passing drops of water; a mataphorical

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[48] See Eshag, 1963, p. 13.

image for the capital goods which enter a business and then leave it, when they wear out and are replaced by other items. Behind that position there was, clearly, an analytical reason: the desire to represent the total output of the economy as a function of current inputs, without the complication deriving from the presence of a stock of intermediate products.

Marshall did not pay to the theory of pure capital more than a couple of casual remarks. One of them, confined in a footnote in the *Principles*, was that the scope of the Clarkian notion of capital was to provide a conceptual link with the theory of interest[49]. No comment followed upon the convenience of this procedure. But in his private correspondence with Clark[50], speaking of the distinction between interest and rent in the long-period, Marshall noticed that the Clarkian construction implied a constant stock of capital and could therefore be applied only to the special case of a stationary economy, where relative prices, resources and technique do not change over time and capital is maintained "intact". His objection was that in the real world "the stock of capital is not fixed as the stock of land is". Seemingly, it meant that in his opinion capital theory had been artificially deprived by Clark of its essential dynamic character.

Another approach to "a theory of capital without fixed capital", where all means of production were completely used-up in a single period, was the Jevonian and Austrian one, which looked at capital as a revolving and composite stock of stored-up services of two "original factors", labour and land. The amount of capital was there measured by multiplying the value of the current flow of inputs by an average investment period. It had to be calculated by weighting the single inputs which entered at different times the productive process, taken with their own investment periods, by a compound interest formula. This circumstance introduced a serious difficulty: once the period of production was regarded as a function of the rate of return to capital which it was supposed to explain, a time-pattern of inputs could exhibit a "paradoxical behaviour", in the sense that it could be ranked either above or below another one, in terms of the length of its implied period of production, according to the level of the rate of interest. The validity of the theory was therefore restricted to point-input point-output processes - those of growing trees or aging wine - with technologically given lags.

This is the famous objection later raised by Wicksell. Marshall did not make this critique, but he could not endorse a

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[49] Marshall, 1890, 8th rev. ed., p. 62 n.

[50] See a letter to Clark dated Nov. 11, 1902, in Marshall, 1925, p. 413.

definition of capital which contrasted "violently with the uses of the market-place" and lacked "a perfectly consistent and coherent abstract idea"[51]. He found that the Austrian theory of capital had an "air of paradox", as a result of its "unwillingness to recognize that the various elements of the problem *mutually* govern one another"[52]. Böhm-Bawerk's causality relation between the rate of interest and the rate of capital accumulation had to be reversed. "In fact" - Marshall noticed - "he seems to have inverted cause and effect. The true doctrine appears to be that, because interest has to be paid for, and can be gained by the use of capital; therefore those long and roundabout methods, which involve much locking up of capital, are avoided unless they are more productive than others"[53].

Another "pure" theory of capital was implied by the Walrasian system, a static equilibrium framework for dealing with market interrelations, where durable social wealth, including labour and land, was regarded as capital. Capital goods ("capital properly called") were priced by solving a set of capitalization equations, under the boundary condition of a uniform rate of return. The rate of interest was determined as the ratio between the prices of capital services and those of capital goods. Marshall - known to have always kept a "cool and superior attitude to Walras"[54] - made no significant comment on this general equilibrium capital conception. But his realistic mind could not appreciate an axiomatic and abstract approach to the problem. He reckoned it in a group of French theories that "used the term Capital very much in the sense in which Adam Smith and his immediate followers used the word Stock, to include all accumulated wealth", rather than "in the narrower English sense"[55].

Compared to the above abstract conceptions, Marshall's theory of capital provided a more realistic, though somewhat less systematic approach to the problem. His ideas were fairly consistent both with the basic needs of rational knowledge felt by economic agents in their practical activity and with the rest of his theoretical construction, particularly with his value and monetary theories. The formal remark that his work in the field of capital, interest and profit was not "technically" developed in

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[51] Marshall, 1890, 8th rev. ed., pp. 650-51 n.

[52] *Ibidem*, p. 484 n.

[53] *Ibidem*, p. 485 n.

[54] See J.K. Whitaker, in Marshall, 1975, I, p. 106.

[55] Marshall, 1890, 8th rev. ed., pp. 648-49.

the analytical framework of a general equilibrium theory is scarcely relevant, in my opinion, unless one proves that this attitude led Marshall to erroneous conclusions.

8. Something more may be said on the relation between the theory of capital and the theory of money in the Marshallian system. As a cash-balance quantity-theorist, Marshall held a real theory of the long-period determination of the rate of interest. He thought that an increase in the supply of money would have led to a higher price level; not to a higher rate of return on real capital and to a higher interest rate on money loans. Mindful of the discussions on the role of monetary policy raised by the Bullion Report, he was however inclined to hold a monetary explanation for the current level of the rate of interest, which he related to the supply and demand for capital loans[56].

The notion of a "natural" or "normal" rate of interest - independent of the supply of money, the supply of gold and the amount of government borrowing, and equal in equilibrium to the rate of profit - was an essential component of the unwritten monetary doctrine Marshall professed when he was teaching in Cambridge. This is testified by a number of sources: from Marshall's Evidence before the Gold and Silver Commission, in 1887, to his own recollections, thirty-five years later, in *Money, Credit and Commerce*. According to this doctrine, the rate of interest - "the price paid for the use of capital in any market"[57] - was regulated in the long-run by the average profitability of economic activities, a real variable[58], and by the amount of free capital in search of investment, expressed in terms of stable money. It was thus subject to the persistent and regular influence of thrift and productivity, the real forces which determined the supply and demand for capital.

Marshall used to distinguish between a market for capital loans, where "money" rates of interest were determined by the demand and supply of money for loans of different time length, and a market for capital goods, where a "real", long-period-equilibrium rate was durably established "by the profitableness of business". Money and real rates were brought to equality by arbitrage and speculation.

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[56] See Marshall, 1923, p.75, and 1926, p. 130.

[57] Marshall, 1890, 8th rev. ed., p. 443.

[58] "The permanent rate of discount has no connections with the amount of currency. The center about which the discount fluctuates in my opinion is determined by the profitability of the business" (from Marshall's Evidence before the Royal Commission of Currency, Marshall, 1926, p. 45).

Though the linking of a "real" theory of capital with a monetary theory of interest seemingly called for a two-rate interest doctrine - as suggested by Henry Thornton at the beginning of the century, in his *Paper Credit of Great Britain* - Marshall took a different position, because he did not attribute to the short-term interest rate a monetary nature. He recognized, however, that it was subject to the influence of a number of temporary and occasional factors, most of which of monetary nature. Still more important, he believed that such factors could also affect the real rate of interest, through their influence on price expectations and on the demand for loans.

This allowed for an asymmetric determination of the rate of interest and the prices of capital goods in short and long periods. In the short-period, when the supply of free capital could not exceed the amount of savings previously accumulated, the rate of interest was thought to be determined by the demand for loans. The prices of capital goods could diverge from their costs of production, because of the decisive influence of the existing stocks. In the long-period, the rate of interest was a real variable, determined by the technical conditions of production, by the real wage and by relative factor prices, as in the Ricardian theory. The supply of capital could increase or decrease as a result of a change in the rate of interest, but its interest-elasticity was bound to be modest, because of the relatively large magnitude of the existing stock of capital and of the presence of other factors affecting the supply of capital[59].

In Marshall's opinion, the conditions which regulated the values of capital goods and those of gold and other precious metals were pretty similar. Since capital goods lasted for a long time, the supply of new capital goods was a relatively small fraction of the total stock in existence and their current values were bound to be strongly affected by demand conditions. For a similar reason, Marshall thought that the use of precious metals as a currency basis was unfit to ensure in the short-period a stable standard of value[60].

From an analytical point of view, Marshall had the choice between two options: that of regarding the rate of interest as a

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[59] Marshall, 1890, 8th rev. ed., pp. 443-44.

[60] In his 1886 reply to the Royal Commission on the Depression of Trade and Industry (Third Report, Appendix C, pp. 31-34), Marshall proposed the official adoption of a tabular standard of value: his standard unit of constant purchasing power, "the unit", reckoned on a national basis and independent of gold and silver. See also Marshall's essay on Remedies for Fluctuations of General Prices, "Contemporary Review", March 1887, repr. in Marshall, 1925, pp. 188-211.

price determined by supply and demand conditions entirely independent of it and that of assuming a mutual dependence of the rate of interest and the supply and demand functions. Both options led to the determination of the temporary equilibrium level of the "quantity" and "price" of capital. But only the first one was consistent with the use of a pair of independent supply and demand curves. That was the solution Marshall foreshadowed in the early 1880s and ultimately adopted in *Money, Credit and Commerce*[61], where he assumed that the short-term equilibrium level of the rate of interest was determined by equality of the demand and supply schedules on the loanable funds market[62].

The attention paid by Marshall to the role of monetary factors in the determination of the current level of interest rate marked a significant departure from the received view of a strict neutrality of money. In the long-period, under a set of *ad hoc* conditions[63], the direction of the causality relation between real and monetary factors was assumed to move in the standard classical way, from the real forces underlying natural prices to the nominal variables affected by the supply of money. But in the short-period, under managed money and changing price expectations, the causality relation could go the other way round and monetary policy could interfere with the working of the norm.

A temporary change in the supply of money would in general start cumulative price movements which would affect the demand for capital and ultimately restore the rate of interest that could be obtained "when the economic conditions of the country have been nearly uniform for a long period of time"[64]. But any attempt by the monetary authorities to maintain for some time an excess or a shortage in the supply of money would prevent the equilibrating process and lead people to formulate new price expectations, suited to affect the norm. The task assigned in the Marshallian system to the theory of money, in the presence of monetary policy

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[61] See the first of three Fragments on Marginal-Productivity Theory, in Marshall, 1975, II, pp. 101-03; also Marshall, 1923, Appendix C, p. 282-83, for a diagram of the demand and supply curves for a stock of gold.

[62] Previously, in The Economics of Industry, he had given his preference to the alternative approach. "The rate of interest rises with a diminution and falls with an increase of the amount of free capital offered on loan. Conversely, the amount of free capital increases with a fall and diminishes with a rise in the rate of interest" (Marshall, 1879, p. 124).

[63] Namely, flexible prices, unit-elastic expectations, no money illusion, no distributive effects and absence of a systematic monetary policy devised to affect the real variables of the economy in a single direction.

[64] Marshall, 1879, p. 126.

and changing expectations about future prices, went therefore far beyond that of explaining occasional deviations from the norm.

Marshall's concern for the influence of monetary policy on the normal rate of interest does not seem to have been sufficiently noticed in the literature on the subject[65]. Yet it represented a substantive advance in the Keynesian direction of an integration of real and monetary theory[66]. It allowed for the maintenance of the quantity theory of money in the long-period, under restrictive conditions implying neutral money, and for a possible dismissal of the quantity theory in the short-period, when liquidity changes can affect interest rates and result in disequilibrating price movements.

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[65] See, for instance, Eshag's questionable assertion that "it is very difficult indeed to discover any important original ideas in the work of Marshall on money in relation to the works of his predecessors and contemporaries" (Eshag, 1963, Preface, p. xiii). As concerns Marshall's analysis of short-period speculative price movements induced by a changing supply of money and credit, this statement is untrue.

[66] "When we come to discuss the causes of alternating periods of inflation and depression of commercial activity, we shall find that they are intimately connected with those variations in the real rate of interest which are caused by changes in the purchasing power of money" (Marshall, 1890, 8th rev. ed., pp. 493-94).

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Summary: ALFRED MARSHALL AND THE THEORY OF CAPITAL

Marshall's theory of capital was designed to serve two main purposes: an integration of the theory of income distribution into a general theory of value and the closing of the gap between economic

theory and business practice. For the first purpose, capital was considered the reward for the services of a specific factor of production; for the second, a generic source of income, "all things other than land which yield income". This implied a certain ambiguity, because the two notions of capital were clearly inconsistent with each other. The final setting of the Marshallian system was characterized by the presence of three different theories of capital, kept together by a demand-and-supply determination of the rate of interest, which provided a link with the theory of money. Everything was granted a role - productiveness and prospectivess, efforts and waitings, real and subjective costs - but the result was still highly controversial. The principal merit of Marshall's theory of capital was the establishment of a functional link between the theory of value and the theory of money. As a quantity-theorist, Marshall held a "real" theory of the long-period determination of the rate of interest, in the absence of monetary policy; but he thought that the current level of the rate of interest could be influenced by monetary factors. An active monetary policy would both affect the "real" interest norm and produce occasional deviations from it. This position, quite new, was a significant advance towards an integration of real and monetary theory.