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The classical roots of the Austrian theory of capital and entrepreneurship

By Ferdinando Meacci and Carmelo Ferlito

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Abstract The paper deals with the continuities and discontinuities between some classical, Austrian and neo-Austrian authors with regard first to the theory of capital and then to the theory of entrepreneurship.
Part I focuses on the elements of continuity between the classical and the Austrian theory of capital. These elements have been singled out by dealing first with the distinction between individual and national capital; and then with the difference between the resulting circulating-fixed capital and free-invested capital distinctions in the light, first, of the concept of roundaboutness and, then, of the method of vertical integration.
Part II focuses on the elements of continuity between the Austrian theory of individual behaviour and the classical theory of national wealth. The distinctions between logical and historical time and between economics of time and economics in time are used to assess the links between the theory of capital, as developed by the classics and Böhm-Bawerk, on the one hand, and the theory of entrepreneurship, as developed by the neo-Austrians, on the other.

Keywords Capital-theory, entrepreneurship, value, time

JEL Classification B12, B13, B25, D24, E22, L26

Introduction

Speaking of Böhm-Bawerk's theory of interest and period of production, Schumpeter (1954: 846) argues that these are just "two elements in a comprehensive model of the economic process, the roots of which may be discerned in Ricardo and which parallels that of Marx". Leaving aside the theory of value (on which it is impossible to find authors as far apart as Ricardo and Marx, on the one hand, and Böhm-Bawerk, on the other) and avoiding to focus on the theory of interest (which was, however, Böhm-Bawerk's final aim and success) as well as on the more recent theory of fluctuations (which was, by contrast, Hayek's new aim), it remains to be seen whether Schumpeter's statement holds with regard to the theory of capital and to its crucial concept of the higher productivity of time-consuming methods of production. In the following decades many scholars have focused exclusively either on the classical or on the Austrian theory of capital while just a few of them have extended their analysis to the similarities between the two theories[1].

Now, if one focuses exclusively on capital, one can realize that these 'roots' can be noticed not only in Ricardo but also in other classical authors in so far as they shared, or tried to improve, the theory of capital inherited from Adam Smith. In this sense, Böhm-Bawerk's theory can be viewed not only as a link between the classical and the Austrian theory of capital, but also as a condition for the further development of this theory as carried out, on the one hand, by John Hicks and, on the other, by Austrian economists of a more recent generation. Under this perspective it is necessary to mention not only the book on the theory of capital published by Hayek (1952) [1941] at the end of a series of controversies on these and related issues[2], but also, and above all, the books on the same theory published by Lachmann (1978) and Kirzner (1996) at the beginning of the so-called 'Austrian revival". The two protagonists of this revival opened the door to a series of successive developments and reconstructions some of which are based on the Menger-Lachmann trajectory (see Harper and Endres, 2010), while others are rooted in Böhm-Bawerk's own theory (see Hennings, 1997). Among the most recent literature, we can mention here Garrison (2001)[3], who has tried to build a capital-based macroeconomics open to a dialogue between the Austrian and other streams of economic theory, and Lewin (2011) who, as a student of Lachmann, has extended the latter's analysis to modern issues such as business organization[4] and human capital[5].

This paper is accordingly divided in two Parts. Part I will focus on the similarities (and dissimilarities) between Adam Smith (as leader of the classical theory of capital), Böhm-Bawerk (as leader of the corresponding Austrian theory) and Hicks (as leader of the derived neo-Austrian approach to this theory). Part II will focus instead on the dissimilarities (and similarities) between Böhm-Bawerk and the following neo-Austrian authors who eventually turned the theory of capital

[1] Considerations of space will prevent us from dwelling on all the converging or conflicting contributions in this multi-directional development of that theory. But whether or not discussed in this paper, all these contributions support the idea that the theory of capital is so complex that, wherever one starts from, it is hard to bring more than one, or only a few of its parts, into view. For, as Hicks (1973b: v) puts it, it is here "just as if one were making pictures of a building; though it is the same building, it looks quite different from different angles".

[2] These controversies are summarized by Hayek (1952 [1941]: 47, n. 1; see also *ibid*.: 59, n. 1) as running between the 'Anglo-American' and the 'Austrian School' (but also, he admits, within the latter) although, he adds, by extending the former school to its English beginnings, "the classical English economists since Ricardo, and particularly J. S. Mill (the latter probably partly under the influence of J. Rae) were in this sense much more 'Austrian' than their successors". For an updated account of the 'Austrians versus Austrians' controversies, see Pellenghar (1986a, 1986b) and Endres and Harper (2011).

[3] Garrison's model is mathematically developed by Cachanosky and Padilla (2016), while statistically significant evidences are brought out by Young (2012). See also Ravier (2011) and Hülsmann (2011).

[4] See Bylund (2016) for a link between production theory and theory of the firm.

[5] For an overview of past and recent debates on the theory of capital and on some related issues, see Eatwell, Milgate and Newman (1990) and Bliss, Cohen and Harcourt (2005).

(and its principal agent, the capitalist) inherited from the classics into the theory of entrepreneurship (and its exclusive agent, the entrepreneur).

Part I. The theory of capital between the classics and the Austrians

1. Capital: two points of view

The closest connection between the classical and the Austrian theory of capital and, more particularly, between Adam Smith's and Böhm-Bawerk's theory, resides in their common distinction between the concept of capital from the point of view of an *individual* (individual capital) and the concept of capital from the point of view of the whole *society* (national capital). Their similarities with regard to this distinction are more important than the different roles and limits assigned by Smith and Böhm-Bawerk to those two concepts

Such a distinction is first brought to the reader's attention when, at the beginning of Book II of the *Wealth of Nations*, Smith starts by distinguishing "the stock which a man possesses" from "the general stock of any country or society" and, consequently, the concept of capital as a portion of the stock intended in the first sense and then as a portion of the stock intended in the second sense. From that moment onwards capital is intended sometimes as the capital of an individual (which includes the idea of property) sometimes as the capital of the whole society (where this idea is not included) and sometimes in any of these two senses. This threefold meaning of the concept of capital is supported by Smith's famous statements that "the general stock of any country or society is the same with that of all its inhabitants or members" (II,I,296) and that "the capital of a society, which is the same with that of all the individuals who compose it, can be increased only in the same manner" as the capital of an individual; i.e. only by saving (II,III,358-9). We shall see later in what sense the latter statement reappears in the Austrian and neo-Austrian views of saving. For now we must focus on the limits of the similarity, first, between Smith's two statements above and, then, between Smith's and Böhm-Bawerk's treatment of their consequences.

As regards Smith. It must first be noted that Smith's two statements quoted above should rather be intended as the result of a crucial *assumption*. This consists in assuming, that "in a work such as this" (as Smith repeatedly points out), any discrepancy that may arise *in actuality* between what constitutes the capital of an individual and what constitutes the capital of the whole society is ruled out. This crucial assumption is not unrelated to the further (and apparently contradictory) distinction between the concept of capital as a *stock* and the same concept as a *fund* as put forward by Smith in chapters I and III, Book II, of the *Wealth of Nations*. For, while the former concept is an introduction to the latter in the sense that it provides a snapshot of capital in its existence at an instant of time, the latter is rather focused on capital in its becoming from time to time. Furthermore, while the former concept is used by Smith sometimes from the standpoint of an individual and sometimes from the standpoint of the whole society, the latter concept essentially belongs to the latter standpoint, in which case – as we shall see below – it was called 'funds destined for the maintenance of productive labor' by Smith (and other classics), and 'free capital' by Jevons.

With respect to Böhm-Bawerk: Right at the beginning of his *Positive Theory*, he argues that Smith was the first to distinguish, however ambiguously, the concept of *national* capital (which he regards as 'a genuine innovation'; II, n. 8, p. 402) from the concept of *individual* capital. Hence the 'shift in point of view' required when it comes to individuals, who are said to "derive a gain not only from the production of new goods but also from lending to other individuals", as distinct from the whole society which "has no way of enriching itself other than through the production of new goods" (II, I, iii, 19ff). This leads Böhm-Bawerk to distinguish means of *production* from means of *acquisition* and

to conclude that while these two concepts may not coincide for individuals, they do for society as a whole (II, I, iii). It is here that an important difference between Smith's and Böhm-Bawerk's theory of capital arises. For, since Böhm-Bawerk's aim is to develop a theory of *interest* in the sense that interest "represents a form of acquisition of private wealth" (I,5), he ends up by resorting to both concepts as ambiguously as Smith had done within his own and very different theory of *profit*. When, for instance, he comes to his own concept of national capital, Böhm-Bawerk parts company with Smith when hinting at the institution of private property as something to be added to what constitutes the true substance of that concept; whereas, when he comes to the concept of individual capital, he regards such an institution as the core of whatever is included in it.

2. Capital: three distinctions

In spite of the importance of the basic distinction between the capital of an individual and the capital of the whole society, Böhm-Bawerk fails to focus on the relationship between this and the further distinction, first introduced by the classics, between circulating and fixed capital, and then reformulated by Jevons (1879: VII) between free and invested capital. The fundamental difference between this further distinction and its reformulation is that while this distinction can be regarded, as Smith did better than others, from the two points of view just mentioned, its reformulation holds only in so far as the adopted point of view is that of the whole society. The perception of this difference is necessary for clearing up Smith's ambiguities concerning the 'two different ways' in which capital may be "employed so as to yield a revenue or profit to its employer" in the context of the two points of view just mentioned and implicit in those 'two different ways'. For, when it comes to this context, the point of view of an individual reappears as an introduction to the point of view of the whole society, i.e. to the process of production and reproduction of national wealth. Hence the emergence of national capital once the money capitals of individuals have been employed in order to purchase what is possessed either by labourers (labour power in Marx's terminology) or by other individuals (intermediate products)[6]. This is how national capital comes to be viewed, in the latter case, as a flow of wage-goods (final goods destined for the maintenance of living labour in a process of further production) and, in the former case, as a stock of intermediate products (dead labour used together with living labour *in* such a process). These two aspects of national capital are understood, and linked to each other, by Smith, Ricardo and other classics when resorting to the concept of "funds destined for the maintenance of productive labour" in anticipation of what Jevons will eventually do by resorting to his own concept of 'free capital' (1879:263-264)[7].

This similarity between otherwise diverging authors did not escape Böhm-Bawerk's attention. This occurred, however, in two different, though equally unsatisfactory, directions. For, on the one hand, Böhm-Bawerk rejected "the unanimity with which the economists from the earlier English school right on through A. Wagner count the means of subsistence of productive workers as a part of social capital" (II, I, iv, 71). On the other hand, he based this rejection on the *petitio principii* by which "these things may not be reckoned as a part of capital from the standpoint of the whole nation, if that capital is defined as a complex of means of production" (which is exactly as Böhm-Bawerk

[6] The term 'capitalist' does not belong to Smith's language. Later on it came to be preferred to the terms 'manufacturer' (the species of a broader genus) and 'master'. The term 'capitalist' will be used in this paper to mean, in Marx's footsteps (1976: Chap. 4, §1, Chap. 24, §3), 'a personified capital' or 'one of the wheels' of the social mechanism (*Triebrad*), or, more specifically, a *will* combined with an *expectation*. On the role of entrepreneurs, as distinct from capitalists, and of expectations, see below Part II.

[7] It must here be noted that the concept of free capital has been explicitly used in an Austrian context by Strigl (2000) [1934]. For this author has highlighted not only the links between the concept of free capital (or subsistence fund) and the "law of the higher productivity of roundabout methods of production", but also the difference between money capital (as the originary form of the capital of an individual) and free capital (as the originary form of the capital of the whole society)

had defined it)[8]. Thus, after regarding capital as the set of produced means of production (and therefore as the *outcome*, rather than as the *source*, of roundabout methods of production) in the double context of the 'uphill pull' (by which capital, so intended, 'is created in the first place') and of the 'downhill pull' (the 'end product' of which reappears in a 'form ready for consumption') (II, Ii, iv, pp. 95-96; see also footnote 1), Böhm-Bawerk fails to notice that the two 'pulls' may be viewed as an introduction to Jevons' sophisticated distinction between the 'amount of capital invested' (capital being here intended in real terms as 'a quantity of one dimension', i.e. a given quantity of wage goods advanced as free capital) and the 'amount of investment of capital' (capital being here intended again in real terms but now in two dimensions, i.e. as the quantity of capital in the previous sense and the length of time during which this quantity remains invested) (1879: 249ff). Yet it must be noticed that the beginnings and continuation of these 'pulls' are the result of labour being 'put into motion' (to use Smith's own expression) by free capital (to use Jevons' own expression) at any stage of the roundabout process of production (to use Böhm-Bawerk's own expression). Hence the importance of distinguishing the circulation of national capital (going from the flow of final goods advanced as free capital to the flow of final goods reappearing as national revenue) from the circulation of individual capital (in the form of money as the purchasing power going from one individual to another within (according to Smith's assumption mentioned above) the overall process of production and reproduction of national wealth).

3. Roundaboutness in classical and Austrian theory

Leaving aside the problems and controversies concerning the theory of interest, however linked this theory may be with Böhm-Bawerk's theory of capital, we will focus, in what follows, first on some evident, and then on some hidden, roots of the latter theory. This will bring us, looking backward, to John Rae's contribution to this theory (including his disagreements with Adam Smith) (1965) and, looking forward, to John Hicks' (1973a, 1973b) development of the analytical method of vertical integration within his neo-Austrian approach to that theory. Böhm-Bawerk's idea of roundaboutness lies in between.

3.1. Before focusing on Rae's treatment of roundaboutness, it is worthwhile to dwell on his attack on Smith's view of the capital of society as being the same with that of all its individual members[9]. We have seen above that this view, far from conveying what Rae intends to be Smith's identity of individual and national interest, is just an assumption used by Smith to achieve his most general aim, i.e. to show how individuals, by managing their wealth according to their self-interest, end up by promoting, beyond their own intentions, the interest of the whole society, i.e. the growth of national wealth[10]. So there is no doubt that Smith would agree not only with Rae's maxim that "ex nihilo nihil fit" (p. 12) (in the sense that the behaviour of individuals is, for Smith in the first place, a necessary

[8] Böhm-Bawerk, who is so prone to single out circularities in other scholars, is not extraneous to this flaw. See, for instance, the passage where he rejects the 'older theory of capital' (including Jevons' theory) by arguing that "*consumer* goods were looked upon as *producer* goods" as if they were the sole form of capital (a rejection based, indeed, on Böhm-Bawerk's own view of producer goods as the sole form of capital) (II, IV, i, 281). On the habit of capital theorists to "lay claim to one and the same terminological label for the different things defined", see Böhm-Bawerk himself, II, I, iii, p. 31.

[9] Rae (1965: 9).

[10] Thus Rae is both consistent and wrong when dealing with such an assumption as if it were a self-evident principle. He is even more wrong when tracing the "identity of the interests of nations and individuals" to "the identity of the ends which they pursue" (1965: 24) as if there were no difference between the *ends* pursued by individuals and the *outcomes* of their behavior in the economy as a whole. This does not prevent him from coming to the distinction between 'absolute' and 'relative' capital (*ibid*., Chap. VII) which is partly similar to the distinction between national and individual capital discussed above.

source of the capital of society) but also with Rae's own distinction between the process of *acquisition* and that of *creation* of wealth (in the sense that the former implies, for Smith in the first place, just a transfer of existing wealth whereas the latter results in a creation of *new* wealth). The fact is that Smith would also object that Rae is utterly wrong in discerning the common reason behind both that maxim and that distinction. This reason lies in Smith's own distinction, mentioned above, between the capital of an individual and the capital of the whole society. This distinction is a logical necessity even when it is convenient to limit the analysis, as Smith does in Book II, to circumstances in which whatever corresponds to the former concept coincides with whatever corresponds to the latter.

3.2. Rae's own theory of roundaboutness emerges in the central chapters of his book. In these chapters he is able not only to expand, without admitting it, Smith's own theory of capital; but also to anticipate, without being aware of it, Böhm-Bawerk's own theory. Here Rae parts company with both authors when erecting his theory of capital on the concept of 'instruments' as whatever is produced by human labour (including, for instance, bread) for the satisfaction of any human want. But he joins forces with both of them when highlighting (more than Smith had done and as much as Böhm-Bawerk will do) the role of time in production[11].The development of this idea brings Rae's theory closer, in one direction, to Smith's and, in a different direction, to Böhm-Bawerk's[12].

As regards Smith. It should first be noted that the comparison between what happens in these different periods is carried out by Rae in terms of what he refrains from admitting to be Smith's concepts of labour *embodied* (in 'instruments') and labour *commanded* (by their 'events'). In this perspective, the instruments of order A, B, C etc., being defined by Rae as instruments that in one, two, three or more years would "issue in events equivalent to double the labour expended on their formation" (p. 101), may be re-defined as instruments that in one, two, three or more years would issue in a command of labour equivalent to double the labour expended on their formation.

As regards Böhm-Bawerk. One should first notice what he argues in this connection, namely that Rae's concern is not with the explanation of interest but rather with the "augmentation of national wealth" (I, xi, p. 224). And it should then be added that, being concerned with the former problem rather than with the latter and, more particularly, with his own concepts of interest and rate of interest rather than with Rae's concepts of 'return' and 'rate of return', Böhm-Bawerk comes to an assessment of Rae's two lines of reasoning (i.e. the psychological one based on the 'effective desire of accumulation' and the technological one based on the ranking of instruments according to their 'more slowly returning orders') starting from, and in the light of, his own theory (I, xi, 227ff). Here Böhm-Bawerk aims to prove, on the one hand, the complete parallelism between the psychological factors

[11] Rae's focus on this role is based on the idea that all instruments "possess in common the characteristic that between their creation and their exhaustion a period of time must elapse" ; and that each instrument may be assigned to a specific 'order' in a series of rankings according to the different periods of formation and exhaustion of its 'capacity' (intended as its power to produce 'events', in Rae's terminology, or 'renditions of service', in Böhm-Bawerk's). These concepts are used by Rae (1965: Chap. X) as a static introduction to his dynamic view of roundaboutness when dealing with the causes and effects of the 'progress of invention' and with his final distinction between 'accumulation', 'augmentation' and 'increase' of stock or capital. For an early discovery (and superficial presentation) of Rae's theory of capital, see Mill (1987: Book I, Chap. XI).

[12] The first thing worth noting in this connection is Böhm-Bawerk's observation that his 'period of production' does not include Rae's 'period of exhaustion' (so that Rae's 'instruments' do not coincide with Böhm-Bawerk's 'intermediate products') (I, xi, pp. 238-239, and n. 11, p. 464). This observation, however, is not in line with Böhm-Bawerk's further notion of the subsistence fund as including whatever Rae calls 'instruments', i.e. *all* goods (regardless of whether they are consumer goods *in actuality* or consumer goods *in potentia*) (see II, iv, chs. ii and iii, and particularly pp. 312-325). This dangerous ambiguity reappears in Taussig's development of his appropriate distinction between 'inchoate' and 'enjoyable' wealth (1935) into a confusion between consumer goods *already* there and consumer goods *to come*; as well as into a misinterpretation of Ricardo's theory when concluding that Böhm-Bawerk's concept of subsistence fund "has more than a family resemblance to Ricardo's analysis of capital as a succession of advances to labourers" (1935: 315-316).

underlining Rae's first line of reasoning as well as his own first and second cause of interest; and, on the other hand, the incomplete similarity between the technological factors underlying Rae's second line of reasoning and his own third cause of interest (see I, xi, 238; and II, iv).

As regards Smith, Böhm-Bawerk and Rae, it should eventually be noted that Böhm-Bawerk, while neglecting Rae's misleading criticisms of Smith's distinction between the capital of an individual and the capital of the whole society, ends up by criticizing Rae's second line of reasoning on the ground that it includes a confusion between *quantities* and *values*. The vehicle for this confusion is, according to Böhm-Bawerk, the concept of 'capacity', defined as it is by Rae in terms sometimes of quantities and sometimes of values (in their turn intended sometimes as use values and sometimes as exchange values) (I, xi, 228-232). Böhm-Bawerk, however, fails to trace both this confusion and the truth that it conceals to the confusion and truth implicit in Smith's own distinction, noted above and neglected by Rae in the first place, between labour embodied and labour commanded. According to this distinction and the theory of value on which it is founded (a theory undeveloped by Rae and radically modified by Böhm-Bawerk), Rae's instruments reappear as products embodying a given amount of labour spent in a less or more distant *past* and providing the command of a greater amount of labour in a less or more distant *future*.

4. Roundaboutness and the method of vertical integration

Leaving aside the diverging conclusions built upon the idea of roundaboutness (particularly when this idea is extended from the realm of plutology to that of catallactics; or, concerning plutology, from Fundism to Materialism: see Hicks, 1974, 1976a), it is now possible to focus on the method of vertical integration (discussed in modern literature, to begin with, by Pasinetti, 1973) as a necessary approach to that idea as well as a way for "returning to the Classical Tradition which the Austrians had kept alive" (Hicks, 1973b, pp. 5-8, 13)[13]. The 'continuous input-continuous output' approach pursued in this connection is presented by Hicks as an improvement on what he regards as Böhm-Bawerk's 'continuous input-point output' approach (into which, Hicks claims, fixed capital does not fit). Some observations are worth making in this connection.

4.1. A first way for discerning the method of vertical integration across the classical and Austrian tradition is to focus, with regard to the classics, on the concept of the exchangeable *value* of commodities resulting from the labour embodied in, or commanded by, these commodities across all the different stages of the production process. And then to focus, with regard to the Austrians, on the concept of *wealth* as consisting of the intermediate products arising in subsequent stages of that process and leading to the final goods arising at the end of it. Both forms of vertical integration, however, are implicit in the texts of most classical economists. Think, for instance, of Adam Smith's view of labour as "the first price, the original purchase-money that was paid for all things" as well as the fund "which originally [i.e. directly and indirectly] supplies it with all the necessaries and conveniences of life which it annually consumes" (*WN*, I.v.2; I.i.1)[14]. Or think of Ricardo's view of

[13] It is interesting to note that this conforms to Hicks' (1973b: 12) assertion that "the 'Austrians' were not a peculiar sect, out of the main stream; they were in the main stream; it was the others who were out of it"; but also that some arguments put forward by Hicks in this connection are somewhat ambiguous or misleading. Consider, for instance, the argument tracing the similarity between the classic and the Austrian concept of capital to the 'business man's viewpoint' lying behind the capital account of a firm; or the argument on Böhm-Bawerk's contemporaries (the 'Realists', as they are called by Hicks, 1973b: 13, or 'Materialists', 1974: n. 2, such as Marshall and Pigou).

[14] In this connection, it should be noted that, when mentioning Jevon's claim that his theory of capital was 'in fundamental agreement' with Ricardo's (1871: 241-242), Schumpeter concludes without a satisfactory explanation that 'it will be convenient' to treat Böhm-Bawerk's theory of capital "as if it were nothing but an elaboration of the Jevonian ideas"; and that (unlike what was argued above) Böhm-Bawerk's subsistence fund "plays exactly the same role as Jevon's wage-good capital" (1954: 903-904).

the distinction between circulating and fixed capital as something "not essential, and in which the line of demarcation cannot be accurately drawn". This view can be reformulated by arguing that this line is more or less visible depending on whether the device adopted for singling it out is the method of horizontal or the method of vertical integration. For everything depends on whether the scholars' 'blinkers' (see Hicks, 1975) are restricted to the horizontal context of one single period (in which case circulating and fixed capital goods are employed next to each other for the production of the annual output); or on whether those blinkers are enlarged to include a vertical context in which the whole process of production reappears as a process of production and reproduction of national wealth[15]. Here capital lies at the core of the process of circulation that goes not so much from *money* to *money* (which is the case when its circulation takes place between individuals) but from the wage goods *now* exchanged for productive labour to the consumption *goods* resulting from this labour as employed in a recent or more distant *past*.

4.2. The method of vertical integration reappears, however implicitly, not only in Böhm-Bawerk's presentation of the core of his theory of capital (II, ii) but also in his arguments on technical progress as a force that shortens or lengthens either a particular stage or the whole of the vertically integrated process of production (see, for instance, III, *Essays* I-III). His further and brilliant observation that the majority of inventions call for a lengthening, rather than for a shortening, of such a process is a reminder of Smith's hint that "an additional capital is *almost always* required" (*WN*, II. 3. 32; italics added) regardless of whether an increase in national wealth comes from an increase in the 'number of productive labourers' or in the 'productive powers of these labourers'[16]. Smith's theory of capital is also brought to mind when Böhm-Bawerk comes to the demand for, and supply of, capital in his discussion of how, once shortening inventions are introduced, "some parts of the means of subsistence that up to now were required to sustain a longer roundabout way now are set *free*" for them to be invested in another branch of industry (III, ii, pp. 27-28, italics added). The concept of capital involved in this sentence (and in other similar expressions used in other parts of Böhm-Bawerk's work) has little to do with the 'produced means of production' on which his initial concept of capital was founded. By contrast, it has a lot to do with the other, more vertically integrated, concept of capital rejected by Böhm-Bawerk from the start, i.e. with the concepts, already highlighted above, of free capital, or of funds destined for the maintenance of productive labour.

4.3. The term 'reproduction' has been used above in a sense that cannot be found either in Hicks, or in Böhm-Bawerk, or in many modern authors in spite of its diffusion in classical literature. But the concept it conveys is a must when the method of vertical integration is used with regard to the economy as a whole. For it would help to replace Hicks' 'continuous input-continuous output' approach with what would be more appropriate to call 'continuous beginning-continuous end' of the vertically integrated process of production and reproduction of national wealth. This process is made visible by the method of vertical integration either in the sense that it provides the observer with a

[15] These blinkers are similar to those implicitly used by Smith when dealing (in different chapters of the *Wealth of Nations*, Book II) with what was called above 'capital in its existence' as distinct from 'capital in its becoming'. A similar use of blinkers can be noticed in a number of other authors starting from Ricardo's use sometimes of the former kind of blinkers (according to the method of horizontal integration) and sometimes of the latter kind (according to the more sophisticated method of vertical integration). The latter kind of blinkers was restricted by Smith to one 'year' (a term imported perhaps from the physiocratic literature of his times) and has been recently enlarged by Hicks' assumption of a 'self-contained period' (1965: Chap. IV). As for Ricardo's use of the term "circulating" capital in the sense of the concept (to come) of 'free' capital, see Meacci (1998).

[16] An hidden link between Smith's, Rae's and Böhm-Bawerk's theories of capital can here be noticed, net of Smith's naïf and misleading reduction of productive labour to a classification of labourers, behind Böhm-Bawerk's (see, for instance, II, p. 415, n. 8; and III, *Excursus I*, p. 19) and Rae's treatment of inventions (1965: Chap. X), i.e. that an accumulation of capital is 'almost always' required, regardless of whether a particular invention does or does not entail a reduction in technical coefficients.

film showing the (direct and indirect) transformation of labour into final goods; or in the sense that, within this film, the same method provides the key for disentangling the current transformation of (dead and living labour) into final goods (through the process of time-consuming production) from the transformation of final goods into living labour (through the exchange of one for the other)[17]. Whatever the sense in which the method of vertical integration is applied to the time-consuming process of production and reproduction, both aspects of this process highlight the importance of the three concepts, mentioned above, of free capital, invested capital and national revenue (or wealth). Whether considered in the context of a given period (in which these three concepts reflect three co-existing realities) or in the vertically-integrated context of a number of subsequent periods (in which case free capital precedes, first, the resulting invested capital and, then, the resulting national revenue out of which free capital springs out again), those concepts, neglected as they may be in the Austrian and neo-Austrian theory, may be used to fill up a void created by Böhm-Bawerk in the first place. This void consists in the failure to link the idea of roundaboutness to the concept of free capital as command of productive labour and, via the concept of invested capital, to the concept of national revenue as a return (with a surplus) of this command one, two or more years later.

5. Hicks as a neo-Austrian and post-classical author

Hicks's focus on the Austrian theory of capital and on its links with the theory of the Classics has undergone a crescendo since his early remark that "the core of truth in the Austrian theory needs to be discovered before we can really claim to have a satisfactory theory of capital" (1946: 193). In his subsequent contributions (see, for instance, Hicks 1965, 1970, 1973a, 1973b, 1974, 1976b) Hicks has expanded this core by tracking down Böhm-Bawerk's misleading arguments as well as by upgrading the "sound elements in his theory" (1946: 222-224) through the 'new construction' (1973a, p. 191) provided by his neo-Austrian approach. This was based on the method of vertical integration and on a revival of interest in the theory of the Classics (1973b)[18].

5.1. Hicks's 'new construction' starts by admitting (1973a: 191) that his initial view of Böhm-Bawerk's treatment of the process of capitalistic production as a 'point input-point output' process (such as storing wine and planting trees) was put the wrong way round. According to this new view, Böhm-Bawerk's approach is rather intended as a 'continuous input-point out' approach (1973b: 7). The main problem arising in this connection concerns, on the one hand, the sense in which the Austrian concept of production as a process in time "is just the same concept as underlies the work of the British classical economists" (1973b: 12); and, on the other hand, whether the two sets of Böhm-Bawerk's arguments, the one relating to the concept of period of production and the other to the notion of subsistence fund, are consistent not only with each other but also with Hicks's own view of Böhm-Bawerk's approach.

As regards the first issue. Hicks' argument that a common view of capital as working (or, as he says without precision, circulating) capital (1965: chap. IV; 1973b: 12) lies behind that 'same concept' ignores that the method underlying the analysis behind the circulating-fixed capital terminology (of the Classics in the first place) is sometimes the method of horizontal integration (in

[17] Hence the role of capital accumulation in supporting not only a larger division of labour (as pointed out by Smith right at the beginning of Book II of the *Wealth of Nations*) but also and more precisely (as Smith himself implies in chapter V of the same Book) an increase in the 'quantity of productive labour' not only in an horizontal but also in a vertical direction (Meacci, 2009a). The latter concept corresponds to what has been called by Taussig, (1935: 169-170) a 'successive' and by Hayek (1952: chap. VI) a 'vertical' division; and, more generally, to what was called by Wicksell a growth of capital in 'height' (rather than in 'width') and by Hawtrey a process of capital 'deepening' (rather than of capital 'widening').

[18] For an introduction to the links between Hicks, the Austrians and the classics, see Faber (1979) and Gehrke and Kurz (2010).

Hicks' own terms) and sometimes the method of vertical integration, depending on whether the analysis is focused on a single period within, or on all the periods of, the reproduction of national wealth.

As regards the second issue, it should here be noted that Böhm-Bawerk's two sets of arguments (as set out, respectively, in Book II and Book IV of his *Positive Theory*) reflect two different ways of implementing the method of vertical integration. While the first set does reflect the 'continuous input-point output' approach lying behind the backward-looking view of the existing stock of capital goods, the second set rather reflects the 'point input-continuous output' approach lying behind the forward-looking view of the same stock as a source of the flow of consumption goods to come. Hence Böhm-Bawerk's (unrecognized) split of the vertically integrated process of production and reproduction of national wealth into a backward-looking *production* period and the consequent forward-looking utilization period. Unfortunately, the subsistence fund is discussed by Böhm-Bawerk only within the second set of arguments as if there were no difference between durable production goods (to be still combined with labour for the production of final goods) and durable consumption goods (to be consumed, without that aim, in a given number of future periods). Böhm-Bawerk's subsistence fund thus appears as the source of potential flows of final goods to be turned into actual flows at different future dates, rather than as a sequence of actual flows of wage goods exchanged *now* for living labour (productive or unproductive).

5.2. The major link between Hicks' neo-Austrian approach and the theory of the classics can be noticed, however, in Hicks' new approach to the machinery question raised by Ricardo in the third edition of his *Principles* (1951: chap. 31) and debated by scholars of different generation ever since. Hicks's involvement in this question dates from the publication of his *Theory of Economic History* (1969: chap. 9) and reaches a climax in *Capital and Time* (1973b, chaps. IX-X). Here Hicks' reconstruction of Ricardo's machinery chapter is introduced by a defence of the wages fund doctrine developed by J.S. Mill 'the Younger' as distinct from J.S. Mill 'the Elder' (who rejected his early defence of that doctrine) in the context of his fourth fundamental proposition respecting capital (*ibid*., pp. 58-62). The analysis leading to this climax is first developed by distinguishing "construction" periods and "utilization" periods of given length (duration) in the dynamic context of a sequence of inventions leading to a reduction in the constructional and/or utilizational cost (input coefficients) in the early and late phase of the *Traverse* (from one steady state to another)[19]. Hence Hicks' advanced re-reading of Ricardo's arguments both in the sense that "the introduction of 'machinery' has an adverse effect on employment *in the short run*", and in the further sense that Ricardo's exception does not arise from any 'improved machinery' but "only from such improvements as have a strong forward bias", so that what Ricardo "will surely have had in mind is not 'improved machinery' (though he says 'improved machinery') but the introduction of machinery" (1973b: 98-99). What, however, Hicks here fails to recognize is that his expression 'introduction of machinery', however exact, is nonetheless misleading in so far as one fails to highlight, first, Ricardo's fundamental assumption by which the machinery under discussion is "*suddenly* discovered, and extensively used" (in Ricardo's own words and italics: 1951: 395); and, secondly, the resulting 'short-run' (to use Hicks's own words above) reduction of what Ricardo here calls 'circulating' (and Jevons would call 'free') capital.

[19] Hicks' 'sequential analysis' is based on a classification of inventions by which these are said to be *neutral* (the proportional cost-saving being the same in both periods), *backward*-biased (the cost-saving arising in a given construction period), or *forward*-biased (the cost-saving arising in a given utilization period). Furthermore, the backward or forward bias of inventions is said to be *strong* or *weak* depending on whether the resulting cost reduction is due to a cost increase in one production period and a stronger cost decrease in the other, or from decreases of different intensity in the two periods. For a treatment of inventions leading to the 'characteristically Austrian problem' of a lengthening or shortening of any of the two periods (under Hicks' alternative assumptions of a 'Full Employment' and of a 'Fixwage' path), see *ibid*., chap. XI.

6. Smith vs. Böhm-Bawerk on interest and profit

We have seen above that Böhm-Bawerk shares with Smith, Ricardo and other classics the distinction between the capital of an individual and the capital of the whole society. It must now be added, however, that when he comes to the associated concept of *profit*, Böhm-Bawerk adopts a new terminology by which the concept of interest is split into the sub-concepts of 'loan' and 'originary' interest. The latter concept is intended to replace the traditional concept of profit which is thus relegated (first by Böhm-Bawerk and then, as we shall see, by his neo-Austrian critics, such as Lachmann) to the concept of 'entrepreneur's profit' as a residual income fluctuating in historical time (to be discussed below, Part II). The changing terminology and analysis thus raise a number of problems starting from Böhm-Bawerk replacing, in his own citations of the classical texts, their term profit by the term interest, and ending up with a final distortion or obfuscation of the overall theory of capital, interest and profit.

6.1. The notion of 'originary' interest is developed by Böhm-Bawerk (I, I and II, iv, ii, sec. 2) as if there were no difference between the *exchange* of present for future goods and the role of present goods in the time-consuming production of future goods. While, however, the former activity is based on the methods of discounting or capitalizing adopted by individuals according to the ruling interest rate, the latter is based on the technical knowledge available in the whole society in a given period as well as on the time constraints necessary for turning it into the production of final goods. The absence of this difference is as crucial in Böhm-Bawerk's notion of 'originary' interest as its presence is crucial in the classical distinction between interest and profit. According to this distinction (explicitly put forward by Smith and other classics such as J.S. Mill, 2004: Essay IV), interest "is always a derivative revenue" (*WN*, I. vi. 18 and II. iv) to be paid from profit made on capital invested in production (or from other sources of income). The real progress made by Böhm-Bawerk with regard to the theory of the classics is his treatment of the problem of the *nature* of interest as distinct from the problem of the determination of its *rate* (see II, iv, ii and iii). For it is one thing to argue how interest is derived from profit (as Smith does with a single and minor contradiction: see the second line of *WN*, I. ix. 11) while it is another thing to argue how the rate of the former is linked to the rate of the latter[20].

6.2. As for the similarities between Böhm-Bawerk, Smith and other classics on these intricate issues, it is eventually possible to focus at least on two further aspects of their thought. One is their different inability to highlight or to extend, either in their words or in their analysis and net of their peculiar distinctions between profit and interest, the important distinction between the return expected by *entrepreneurs* from their investment of the capital advanced by capitalists and the return expected (by economists in the first place) from the free capital invested in the economy as a whole. Always implicit in Smith, the latter distinction was shared by Böhm-Bawerk but, as argued above, only up to a certain point and, however, never in the sense of distinguishing the concept of capital value (as the exchange value of existing capital goods) from the concept of free capital (as the wages fund exchanged for productive labour in the whole economy).

[20] The distinction between the *nature* of interest and the determination of its rate is brought to light when, at the end of his *Excursus XII*, Böhm-Bawerk comes to the distinction between the originating causes of interest and the *determining* factors of its rate (III, pp. 191-193). This distinction reappears implicitly in Lachmann's (1978: chap. V and 1986: 62) criticisms of Böhm-Bawerk's third cause of interest as a 'wrong pigeonhole' and, in Lindahl's and Mayer's footsteps, as just a factor determining its rate. The overall importance of this distinction can be detected in a long series of different misunderstandings starting from the Ricardo vs. Smith controversy on the theory of value. For that distinction can here be used to argue that the principle of labour embodied is needed when it comes to explaining the common *nature* of exchangeable values while the principle of labour commanded is to be added to it when it comes to determining their different *magnitudes* in the capitalist state.

The other aspect of the thought of these authors is their common view of what Hicks calls (in J.S. Mill's footsteps) 'Full Performance' (as distinct from 'Full Employment': 1973b: Chap. V), i.e. the equality (not the identity) between saving and investment under conditions of full utilization of productive capacity. It should here be noted that this view was put forward in the first place by Adam Smith (*WN*, II. Iii. 18) as a fundamental assumption (discussed above), was strengthened as such by Ricardo (*Principles*, chap. VIII, p. 151 note) and other classics (excluding, but only to some extent, Malthus and Lauderdale), was actually shared by Böhm-Bawerk (who correctly regards productive forces, and not consumption goods, as the 'direct object of saving'; ii, v, p. 103) until it was utterly rejected by Keynes when, misunderstanding that assumption for an exclusive principle, he failed to look at it as "a light that illumined much" although this light "left things outside its beam in such darkness that their very existence was forgotten" (Hicks, 1965: 42).

PART II: From the theory of capital to the theory of entrepreneurship

1. Austrians and neo-Austrians between economics *of* time and economics *in* time

The role of time in the theory of production has never been ignored ever since the Physiocrats distinguished between 'avances' and 'reprises'. After this role was investigated in the more general setting of the theory of capital first by Smith and the classics and later on by Böhm-Bawerk, however different their final aims, it has become possible to focus on the different approaches by which different scholars of different periods have focused on the role of time with or without reference to the theory of capital. At the end of this long sequence of efforts, Hicks (1976b) proposed to highlight their similarities and differences by introducing the distinction between economics *of* time and economics *in* time. This distinction may still be used to re-group models and arguments into those where time is dealt with either as a *container* in which the production process unfolds, or those in which it is an *ingredient* that goes into this process. While the latter approach to economics lies behind Böhm-Bawerk's treatment of time-consuming methods of production, the former approach lies behind Menger's new theory of individual behaviour (and his later restricted view of capital as a sum of money invested for the formation of individual incomes)[21]. Thus, once the first generation of Austrian economists had accomplished their task in these two directions (Menger's focus on individual behaviour being more inclusive and consistent than Böhm-Bawerk's), the new generation shifted the focus of attention from their predecessors' economics of time to the economics in time, which focused on the concepts of human action, expectations, uncertainty and fluctuations.

A first attempt to move beyond Böhm-Bawerk's theory[22], albeit still within a static approach, was made by Fetter (1915: Chaps. 20-21) and Mises (1980) through their pure time-preference theory of interest[23]. Most of the attempts to go beyond Böhm-Bawerk's approach in one direction or another were to follow suit. The most significant among them was made by Hayek in his comprehensive attempt to focus on the 'economic process as it proceeds in time' with particular regard to 'unforeseen changes' (1952: Part I and III). When moving, however, to the concept of human action as 'purposeful behaviour', Mises made the most significant step toward the organic application of subjectivism to a

[21] This view is developed by Menger (1888) along with some misleading criticisms of Adam Smith's theory of capital, including some aspects of Smith's and Böhm-Bawerk's distinction, discussed above, between individual capital and the capital of the whole society. See also Braun (2015).

[22] On the 'troubled relationship' on capital theory between Menger, Böhm-Bawerk's and other Austrians see Endres (1987 and 2015: Chapter 9).

[23] For a historical sketch on the different perspectives on capital developed by the Austrian school see Lewin and Cachanoksy (2017).

dynamic theory of capital, followed by Rothbard (2004). This step stressed (in Böhm-Bawerk's footsteps) the idea that capital – intended as the set of existing capital goods – descends from an entirely human characteristic: the ability first to imagine and then to create something new starting from existing but independent elements[24]. The creation of capital goods thus started to be dealt with as a source of creativity in the context of human behaviour. However, before entrepreneurial plans are formed, according to Mises we find the definition of and correlation between ends and means at the root of human action. This definition/correlation is achieved through plans implemented in time, the time dimension being the general container in which economic processes unfold[25].

2. Austrians and neo-Austrians between *logical* and *historical* time

Unlike Böhm-Bawerk, whose theory of capital and interest is entirely based on *logical* time, a successive generation of Austrian economists developed the theory of individual behaviour, inherited from Menger, in the context of *historical* time. The distinction between these two concepts of time was highlighted by Shackle (2009) and Joan Robinson (1979) in their different attempts to go beyond the concept of time used by neoclassic economists, and to focus on a more realistic use of it (as Smith and the classical economists had partially done)[26]. This new distinction, which underlies Hicks' more general distinction between economics of time and economics in time mentioned above, marked a historical change in the intergenerational development of the Austrian theory. For while Böhm-Bawerk's theory was focused on logical time, the neo-Austrian theory is focused instead on historical time as a source of novelty and uncertainty.

In this new context, historical time is regarded – for instance by O'Driscoll and Rizzo who call it 'real time' – as a "dynamically continuous flow of novel experiences" in the sense that "we cannot experience the passage of time except as a flow: something new must happen, or real time will cease to be" (2002, p. 89). Such a vision of time is used by these authors to highlight the three special features of dynamic continuity, heterogeneity and causal efficacy. The first of these features implies a view of time as the context in which individuals involved in its structurally related moments, the past and the future, develop their memory and expectations. As for heterogeneity, this means that in each successive moment the individual's perception of the facts may be, and in fact is, different: the past, once it has occurred, becomes memory, thereby enhancing the present and changing our perception of the future. While changing from moment to moment, this perception makes the characteristics of any moment in time radically different previous moments. The direct consequence of heterogeneity is causal efficacy in that the flow of time modifies the knowledge, awareness and expectations of individuals. As we shall see in more detail later, it is only in the realm of expectational time that a new concept of profit comes to light. In fact, historical time, as the frame in which novelty and uncertainty are generated, allows profit opportunities to appear and to be exploited by individuals endowed with entrepreneurial alertness. Thus while the assumption of logical time makes the concept of *waiting* a sufficient element in shaping, for instance, Böhm-Bawerk's idea of interest, the *uncertainty* resulting from historical time supports rather the new concept of profit in the exclusive context of individual behaviour.

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[24] As it will be noted below (footnote 35), the centrality of human factor, as well as of time, in defining capital goods is highlighted by Rothbard (2004: 58-59) in the context of his view of capital goods as intermediate steps on the way to obtain consumer goods as the final end of the production process. Similarly, Reisman (1998: 445) looks at capital goods as distinct from consumers' goods only in the sense that the former are purchased for "*the purpose of making subsequent sales*".

[25] Rothbard (2004: 47-51) uses the famous example of Robinson Crusoe to explain how time is the essential dimension through which an individual carries out his production plans, including the production of capital goods.

[26] On the role of Shackle in developing the concept of historical time and, more generally, in re-shaping the theory of capital and interest, as our discipline moved into the 'Age of Turmoil' started in the 1930s, see Meacci (2009b).

3. Human action in historical time

Once the distinctions are acknowledged between economics of time and economics in time as well as between logical and historical time, it is possible to improve one's understanding of two concepts that have also been developed in Austrian and neo-Austrian theories. These are the concepts of time preference, on the one hand, and of inter-temporal structure of production, on the other.

3.1. According to the concept of time preference, individuals place present goods higher than future goods in the scale of their evaluations, hence the role of interest as the price of present goods in terms of future goods. Thus Austrians and neo-Austrians equally depart from a concept of interest as the cost of money or the marginal productivity of capital and look at it rather in the context of *future-oriented* versus p*resent-oriented* individuals. While in the former case individuals are savings-oriented, thereby generating the loanable funds to be invested by entrepreneurs in long-term projects, in the latter case individuals are instead consumption-oriented, and entrepreneurs have no propensity to launch or to lengthen the production process. Inter-temporal preferences thus determine (via saving) the pace of investment and the extent of capital accumulation. The emphasis on saving ('parsimony' in Smith's language) is an element of continuity between the Austrians and the classics to the extent that their theories embody those aspects of Say's law that drove Keynes to regard the classics, the neo-classics and the Austrians as the same group of people, known as 'the classics'[27]. Thus in Smith's famous sentences that capitals "are increased by parsimony, and diminished by prodigality and misconduct", or that parsimony "and not industry is the immediate cause of the increase of capital" (Smith, 1976: 320), we can find a direct link with what the Austrians call future-oriented time preferences (parsimony or saving) or present-oriented time preferences (prodigality or consumption). What Smith highlights, and is instead neglected by the Austrians, is the moral emphasis on parsimony versus prodigality. In fact, Austrian economists are more focused on the coordination path along which the inter-temporal preferences of different individuals meet in the absence of any government intervention. They share, however, with Adam Smith and many other classics the importance of saving as a necessary condition for an increase of capital and for a consequent increase of national wealth.

3.2. As for the concept of the inter-temporal structure of production, this was first highlighted by Hayek (1952) in an attempt to link it to the role played by time preferences[28]. Such a link is provided in real life by the plans by which different individuals bring about different combinations or proportions between factors of production. These combinations or proportions are regarded by Lachman (1977a: 204) as the "ultimate determinants of the capital structure". This structure, determined as it is by production plans, can hardly be viewed as stable over time. It simply implies that the neoclassical function of production, in which there is no process but simply the relationship between output and the combination of capital and labour, becomes a tool that is unable to grasp the essence of the production process as it unfolds in historical time (Leijonhufvud, 1986: 203-204)[29]. Furthermore, as noted by Shackle (2009, Chap. 29), the associated notion of capital as a homogenous magnitude impedes grasping the importance of uncertainty and novelty in shaping the ever-changing capital structure resulting from the ever-changing plans implemented by ever-changing expectations.

[27] The topic was recently developed in Pătrui (2016).

[28] Garrison (2001) is the author who has provided the main attempt to build a complete Austrian macroeconomics approach based on the so-called Hayek's triangle (Hayek, 1967) as well as on the central role of expectations as emphasized by Lachmann. Thus the resulting capital-based macroeconomics may be used for developing a business cycle analysis and the effects of government intervention. In particular, Garrison shows how different policies can affect the production structure and, as a consequence, the process of capital formation in a dynamic context.

[29] For an alternative production function, consistent with Lachmann's perspective, see Ferlito (2018: 46-48).

4. Expectations in a kaleidic society

The formation of any capital structure is thus viewed by neo-Austrians as a process that unfolds *in* time and that is in turn influenced, in a context of uncertainty, by the formation of *expectations*. Depending on their (limited) knowledge, tastes and expectations, individuals set up their action decisions or plans. Since they need to interact with one another in order to carry out these decisions or plans, it is only through this interaction that the available information is modified, eventually leading to a revision of decisions and expectations. A 'market process' is thus generated by "this series of systematic changes in the interconnected network of market decisions" (Kirzner, 1973: 10). This process, which arises as a result of the initial ignorance of market participants and of the natural uncertainty of human action, can happen only within the flow of real or historical time: with no market ignorance and no review of plans, no market process is possible.

The idea that expectations are a guideline for forming plans in a context of uncertainty was first developed by Lachmann (1943), following in Keynes's footsteps and in anticipation of Shackle's and his own further contributions. Since human action is a dynamic process that unfolds in time, the set of information available to players constantly changes, leading to a continual modification of expectations, objectives and plans. Hayek (1966: 147) had already recognised the central role of expectations when claiming that profit expectations can lead entrepreneurs to change their preferences in a more future-oriented direction and therefore to promote a greater capital formation (and lengthening the production process). Lachmann, however, was more radical than Hayek when he later focused his view of entrepreneurship in Shackle's direction. He eventually embraced Shackle's (2009: 76-79) concept of the *kaleidic society*, "a society in which sooner or later unexpected change is bound to upset existing patterns, a society 'interspersing its moments or intervals of order, assurance and beauty with sudden disintegration and a cascade into a new pattern'" (Lachmann, 1976: 54). Expectations are thus regarded as the hallmark of a society made up of real players who form their own plans in the face of an unknown future and modify these plans as the future becomes present. The result is that in a kaleidoscopic society "the equilibrating forces, operating slowly, especially where much of the capital equipment is durable and specific, are always overtaken by unexpected change before they have done their work, and the results of their operation disrupted before they can bear fruit. […] Equilibrium of the economic system as a whole will thus never be reached" (Lachmann, 1976: 60-61).

According to this neo-Austrian approach, the process of capital formation is thus centred on the concept of human action as the engine setting in motion the process of plan implementation in the context of an initial set of expectations. However, as the implementation of plans unfolds over historical or real time, expectations are continuously revised, leading to a continuous change in the ends/means framework and therefore in the capital structure, whether existing or forthcoming. A change in expectations, or a shift in time preferences, can drive towards capital destruction or capital creation, the central signal guiding the process of capital formation being the interest rate as determined by the structure of time preferences. Thus variations in the interest rate generate a modification in the inter-temporal structure of production and therefore in the structural composition of the existing capital stock. This can be viewed, therefore, only in its inter-temporal structural composition, thus escaping any possibility of being defined as an aggregate[30].

[30] Starting from Lachmann's view of capital goods as performing an economic, rather than a technical, function, it becomes possible to distinguish the 'hermeneutical moment' (concerning *potential* capital goods or capital structure i.e. the set of goods *thought* to be suitable to bring out a certain output) and the 'implementation moment' (which is concerned rather with *actual* capital goods or capital structure (i.e. the set of heterogeneous goods employed in the production of a certain output). For a more detailed discussion of these two moments, see Ferlito (2016).

Thus the neo-Austrians, like the classics, have developed a concept of interest as utterly distinct from the concept of profit although they regard it, partly unlike the classics and partly unlike Böhm-Bawerk, from the standpoint of the time preferences of individuals rather than (as in Böhm-Bawerk's third cause of interest), from the standpoint of the time-consuming roundabout methods of production. Hence an important clarification within the overall Austrian theory: while Böhm-Bawerk is responsible for the confusion between the old concept of profit and his own concept of 'originary' interest as distinct from 'loan' interest, the neo-Austrians have gained in clarity by distinguishing, although in a different manner than the classics, between interest as descending from time preferences and profit as descending from entrepreneurial activity.

5. Entrepreneur's profit: from Böhm-Bawerk to Lachmann and Kirzner

The framework described above can be defined, in Hicks' footsteps, as economics in time. This is what led the neo-Austrians to develop the concept of entrepreneurship in the context of Mises' theory of human action and of the related concept of profit intended exclusively as entrepreneur's profit.

5.1. The concept of entrepreneur's profit in Austrian theory was initially launched by Böhm-Bawerk (in spite of his economics *of* time approach) and differs from the concept of the classics who used it also as an introduction to the more general concept of the net product or surplus resulting from the employment of capital in the annual reproduction of national wealth. Thus, after turning their attention from the behaviour of individuals in logical time (where it was placed by the first generation of Austrian economists) to their behaviour in historical time (where it has been placed since Lachmann's 1943 article on expectations), neo-Austrian economists started to deal with profit in the new context of individuals taking decisions in historical time – that is, with different and changing knowledge, tastes and expectations. This implies not only a continuous revision of decisions and plans, but also a continuous change in the profits obtained (or in the losses incurred) once these decisions are taken and the plans are implemented[31]. Because this ignorance is somewhat reduced from one period of market ignorance to another, market participants realize not only that they face more attractive opportunities than before, but also that this attractiveness must be evaluated in the light of the opportunities faced by their competitors: when the incentive to offer more attractive opportunities stops, the competitive process stops as well.

In this context, entrepreneurs come to the fore as a special group of individuals who "are able to perceive opportunities for entrepreneurial profits; that is, they are able to see where a good can be sold at a price higher than that for which it can be bought"; they "immediately notice profit opportunities that exist because of the initial ignorance of the original market participants" (Kirzner, 1973: 14). Thus the entrepreneurial spirit or entrepreneurship is an ingredient in the activities of each market participant and leads to a notion of the market process as essentially an entrepreneurial process. One of the most important aspects of this neo-Austrian approach is that entrepreneurship is viewed as a peculiar aspect of human action in historical time and is present, as such, in each individual (Kirzner, 1973: 31)[32]. Thus while Robbins' economizing man can only react, in a given way, to a strictly defined set of ends and means, Kirzner's entrepreneur identifies which ends to strive

[31] "During the given period of time" – writes Kirzner – "exposure to the decisions of others communicates some of the information these decision-makers originally lacked. […] This newly acquired information concerning the plans of others can be expected to generate, for the succeeding period of time, a revised set of decisions". (Kirzner, 1973: 10).

[32] This view of entrepreneurship is important for keeping apart, in a dynamic context, not only the role of entrepreneurs from that of capitalists but also, as Baumol (1990) points out, different forms of entrepreneurship depending on whether they turn out to be 'productive', 'unproductive' or even 'destructive'.

for and which means are available[33]. Entrepreneurship is therefore alertness to "possibly newly worthwhile goals and to possibly newly available resources" (Kirzner, 1973: 35). Such alertness is what is labelled the entrepreneurial element in human decision-making. Thus the succession of different decisions, and of their revisions, can be seen as a sequence of linked actions that is the fruit of the learning process due to alertness. And since alertness is linked with discovery and surprise, it becomes possible to conclude that profit opportunities do not "fall from the sky": they are simply unpredictable consequences of human action within the competitive market process.

The most distinctive feature of entrepreneurship is to move the market from a disequilibrium status toward equilibrium (Kirzner, 1973: 69-75). The starting point of human action, in fact, is always a state of disequilibrium[34], characterized by market ignorance. A similar accent on imperfect knowledge as a basic feature for entrepreneurship to emerge may be found in Knight (1921: 199), in the sense that "uncertainty arises out of our partial knowledge" (Langlois and Cosgel, 1993: 459). According to Knight, entrepreneurs are individuals who are able to judge situations characterized not simply by *risk* (in the sense that future outcomes of current actions can be in some way forecast or quantified), but also, and more importantly, by structural uncertainty, viewed as "a set of possible future outcomes that is open-ended, in the sense that there is no way to know how many possible outcomes should be listed as feasible" (Andersson and Andersson, 2017: 134). It is through interaction in the market that knowledge can be transmitted and acquired, which leads to plans being revised[35]. By allowing such changes to happen, reducing market-ignorance and driving plans toward mutual compatibility, entrepreneurial alertness presents itself as an equilibrating force. As stressed by Lachmann (1978: 54), this will increase the complementarity between plans as well as between the capital goods resulting from them.

If profit is the reward for entrepreneurial activity in a disequilibrium context, the process of capital formation is viewed as the intermediate result of this activity, or the outcome of the implementation of plans up to the point when final goods are consumed. This is the framework in which Lachmann developed Böhm-Bawerk's idea of capital as a set of 'produced means of production'[36] into his own (narrower) view of capital as the existing stock of *heterogeneous* resources (rather than *non-permanent* resources, in Hayek's slightly different view)[37]. And it is also the framework in which he shared Böhm-Bawerk's first and second cause of interest while rejecting the third. This is also the

[33] Kirzner is in good company when contrasting the entrepreneur with the maximizing *homo oeconomicus* of Robbins. In fact, a similar contraposition can be found both in Schumpeter (Ferlito, 2015: 26-30) and Knight (Andersson and Andersson, 2017: 134). For Knight, in particular, "an individual who faces a choice involving structurally uncertain outcomes […] exercises *judgment* rather than a maximizing strategy", so that "a decision maker who judges rather than maximizes is an *entrepreneur*" (*ibid.*).

[34] As stressed by Andersson and Andersson (2017: 136), a common aspect of the main (Knightian, Kirznerian, Schumpeterian) theories of entrepreneurship is that they all "refer to dynamic phenomena that happen when the economy is not yet – or no longer – in equilibrium".

[35] Both Kirzner's and Knight's approaches seem to find embryonic roots in the vision presented by Say (1971) in 1803. Indeed, the classical economist stressed how entrepreneurs continuously face situations of uncertainty so that their peculiar feature is their propensity *to judge* situations and to *anticipate* potential outcomes. This is how they bring knowledge into the production process, ("knowledge of the world as well as of business", as noted by Rothbard, 2006: 26). In this sense Say not only anticipated some of the Austrian arguments on entrepreneurship, but he also seems to have anticipated the discussion about the different types of knowledge later developed by Hayek (1937 and 1945).

[36] And, as noted above (footnote 24), this is also the basic concept behind the idea, developed by Rothbard (2004) and Reisman (1998), that capital goods differ from consumers' goods in terms of their temporal position in the production structure. Thus Reisman (1998: 445) highlights as follows the subjective evaluation behind the nature both of producers' and of consumers' goods: "The roast beef purchased by a restaurant and the washing machine purchased by a laundromat are both capital goods. Exactly the same kind of roast beef and washing machine purchased by a housewife are consumers' goods". Such subjective accent on the way in which goods acquire their status of capital or consumers' goods is a development along the hermeneutical line advocated by Lachmann. Such perspective is further implemented in Ferlito (2016).

[37] For a further elaboration on Lachmann's perspective on capital, see the developments in Ferlito (2016 and 2018).

way in which the neo-Austrians imported the role of self-interest into their otherwise diverging approaches, which was the starting point for Smith himself and the other classics (in order to prove what was of most interest to them, i.e. the role of individual capitals in promoting the growth and distribution of national wealth). In this peculiar neo-Austrian context, what Lachmann did was adjust Böhm-Bawerk's idea of produced means of production, first by focusing on the subjective aspect of their heterogeneity and complementarities within the existing 'capital structure', and then by neglecting the 'produced' aspects of these means, that is, their time-consuming 'origins' (as Hayek himself had done through his 'investment period' – as distinct from the 'period of production' – in the context of a dynamic – rather than a stationary economy; see 1952: Chaps. VI-VII). These origins had been dealt with – albeit up to a certain point – by Böhm-Bawerk and are implicit – through the concepts of labour embodied (in capital goods) and labour commanded (by free capital) – as argued in the first part of this paper – in the classical theory of capital and reproduction of national wealth. Thus by looking at capital as "the (heterogeneous) stock of material resources" and by regarding these resources as whatever is 'man-used' (including land) rather than 'man-made' in the sense that 'historical origin is no concern to us' (1978: 11), Lachmann parted company not only with those authors who, in contrast with Austrians of any generation, rather view this stock as a homogeneous fund, but also with those Austrians who (in Böhm-Bawerk's footsteps) rather view this heterogeneous stock as a result of the labour employed in the roundabout methods of production of final goods[38].

5.2. In spite of the main differences between the classics and the Austrians just mentioned, some further similarities have been admitted by Lachmann himself despite his (in some ways probably misleading) criticisms of Ricardo (see Lachmann, 1977b: 261-262; 1973). One of these similarities hinges on what has been called by neo-Austrians the 'unintended consequences of human action'. Here the theory of capital comes to the fore again as a bridge between the classics and the Austrians. For what the neo-Austrians argue within this theory, as highlighted by Kirzner (1996: Chap. 1) and Lewin (1997: 70), is that capital goods can be seen as 'unfinished plans', in the sense that they are the *intermediate* outcome of implementing plans before their final result is achieved. Expectations, plans, human action and capital goods are strictly interconnected elements on the path toward the achievement of the results planned by individuals but leading nonetheless (net of the fluctuating failures of some plans) to the unintended result of an increase in national wealth.

Now, if capital goods can be seen as unfinished plans, then profit is their desired final result. But, as noted above with regard to the Austrians' own notion of profit, it is only in disequilibrium that profit opportunities actually exist and can be discovered through entrepreneurial alertness. Thus profit, in the sense of entrepreneur's profit as conceived of by neo-Austrians, is a consequence of alertness and must be kept separate from interest for even stronger reasons than it was by the classics. In this sense, Lachmann (1973: 14), who deals in turn with profit as a result of entrepreneurial alertness, looks at it simply as Kirzner does, that is, as a volatile difference between the receipts and outlays generated by entrepreneurial action in historical time and susceptible to presenting itself as a *loss*. In the market economy, each entrepreneur acts in order to maximize his profit (Rothbard, 2004: 512). But the aim or expectation of a future profit is one thing and success in achieving it is another, since it is clear that the success of *all* plans is utterly impossible. Thus, in their struggle for profits

[38] An alternative position, inside the Austrian School, is the one developed by Rothbard, who, following Böhm-Bawerk, stresses (2004: 58) that in "observing the increased output made possible by the use of capital goods, one may very easily come to attribute some sort of independent productive power to capital and to say that three types of productive forces enter into the production of consumers' goods: labor, nature, and capital. It would be easy to draw this conclusion, but completely fallacious. Capital goods have no independent productive power of their own; in the last analysis they are completely reducible to labor and land, which produced them, and time. Capital goods are 'stored-up' labor, land, and time; they are intermediate way stations on the road to the eventual attainment of the consumers' goods into which they are transformed. At every step of the way, they must be worked on by labor, in conjunction with nature, in order to continue the process of production. Capital is not an independent productive factor like the other two". When defining capital goods, therefore, for Rothbard the main elements to be pointed out are the human factor and time.

and in their attempts to avoid losses, entrepreneurs become the equilibrating forces, implying that profits are obtained only insofar as the equilibrium is not reached. In a kaleidic world (historical time) this is exactly the case: coordination tendencies are at work but they never prevail, as equilibrium itself is continuously changing. Hence Lachmann's conclusion that there is no such thing as *a* rate of profit[39], but rather that "there are only *rates* of profit which may differ widely" (Lachmann, 1973: 26). Such a conclusion is drawn from the micro-nature of entrepreneurial action, but also from the heterogeneity of capital goods and not simply from their physical heterogeneity. Even two identical machines can bring out different results if used in different ways or in different conditions of time and space. Thus profits are related by Lachmann less to the physical features of capital goods than to their combinations: capital goods can produce a profit only if used in a certain way, this way being devised by the entrepreneurial function which leads to a continuous re-arrangement of the capital structure (Lachmann, 1978: 3-13). Thus, following Shackle's emphasis on expectational time as the source of uncertainty and profit, Lachmann (1973: 31) – and neo-Austrians in general – regard profit as essentially and ontologically a disequilibrium phenomenon (Kirzner, 1973: 69-75). This view of profit, it must here be added, has very little to do with the classics' view and nothing at all to do with their (however diverging) theory of the tendency of the rate of profit to fall (and of wages to rise). But, leaving aside the most profound differences between the Austrian and classical theories of profit (to say nothing of the differences between Smith's and Ricardo's theories within classical theory itself), it can be eventually noted that, as Smith hints at the end of chapter VIII, Book I, of the *Wealth of Nations*, once profits (however intended) have fallen (for one reason or another), they may be eventually re-generated through the re-organization of production (innovation) carried out by 'masters and manufacturers' (in Smith's own language), by 'capitalists' (in Ricardo's and many other classics' language) or by 'entrepreneurs'[40] (in more recent neo-Austrian language, which in this context is the most appropriate).

Concluding remarks

We have focused above on the continuities and discontinuities between some classical, Austrian and neo-Austrian authors with regard first to the theory of capital and then to the theory of entrepreneurship. Considerations of space have made it impossible to extend the analysis to all the authors involved so far in the development of these two theories. This may be done by other scholars along either similar lines or alternative to those pursued above. The paper has thus been divided in two Parts.

Part I focused on the elements of continuity between the classical and the Austrian theories of capital. These elements were singled out by dealing first with the distinction (sometimes explicit and sometimes implicit in Smith's and Böhm-Bawerk's arguments) between the capital of an *individual* and the capital of the whole *society*, moving then to the difference between the resulting circulating–fixed capital and free–invested capital distinctions, first in the light of the concept of roundaboutness (as anticipated by Rae and later developed by Böhm-Bawerk), and then of the method of vertical

[39] Rothbard (2004: 511) himself has argued that "there is no sense whatever in talking of a going *rate of profit*. There is no such rate beyond the ephemeral and momentary. For any realized profit tends to disappear because of the entrepreneurial actions it generates".

[40] The concept of 'entrepreneur' can be seen in turn as a further link between the classics and the neo-Austrians. In fact, the classical economist Jean-Baptiste Say coined such a word while admitting (1971: 78fn) how difficult it would be to properly translate it into English. He turned then to use 'adventurer' as the most appropriate term in order to describe the "person who takes upon himself the immediate responsibility, risk, and conduct of a concern of industry, whether upon his own or a borrowed capital".

integration (as adopted by Hicks in his own re-formulation of the Austrian theory) in the process of reproduction of national wealth.

Part II focused on the elements of continuity between the Austrian theory of *individual* behaviour and the classical theory of *national* wealth. These elements, in the sense of an extension of one theory by the other, one extension extending the other, were singled out on the basis of the distinction, which was highlighted by J. Robinson and Shackle, between *logical* and *historical* time, and the distinction, in Hicks's more general terms, between economics *of* time (which underlies Böhm-Bawerk's theory of capital) and economics *in* time (which underlies the neo-Austrian theory in a context of uncertainty and expectations). These two distinctions were subsequently used to assess the links between the theory of capital as developed by the classics and Böhm-Bawerk, on the one hand, and the theory of entrepreneurship as developed by the neo-Austrians, on the other.

These links make it possible to extend the elements of continuity between the classics and the Austrians, net of the discontinuities between their different theories, from the direction of the higher productivity of roundabout methods of production in the context of logical time to the more general direction along which individuals – whether capitalists or entrepreneurs – while pursuing their self-interests in the context of historical time, end up promoting the unintended growth of national wealth.

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