CAPITAL AND ITS STRUCTURE: CARL MENGER VS. HIS FOLLOWERS IN THE AUSTRIAN TRADITION

ABSTRACT

We examine various, sometimes divergent, conceptions of capital and its structure in the Austrian tradition from Menger (1871) to Lachmann (1956). We outline Menger’s methodological and philosophical position that recommends investigating the morphology of capital—it’s shape, form and structure; it also recommends maintaining some “realisticness” in the treatment of capital in economics. Prominent Austrian contributions are examined and compared along various dimensions: the existence or otherwise of “original” factors of production, capital aggregation into a stock or fund, time conceptions, analytical domain assumptions, real versus money capital doctrines and the causal role of the entrepreneur in creating capital. We consider the extent to which Menger’s avowed followers and successors diverged from his original vision of capital, subsequent consequences for the development of Austrian capital theory and implications for the study of capital more generally.

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“It was the structural mode of thinking which above all was transmitted from Menger to his successors...The lasting fascination of capital theory for the Austrians, a field where structural analysis is particularly necessary, is itself an expression of the Austrian predilection” (Streissler 1969:250).

1. **Introduction**

Setting aside more ancient capital controversies (Hicks 1974), there were three major capital theory debates that took place over the last 120 years that are familiar to historians of economic thought:

1. the debates among the marginalists and anti-marginalists in the period 1880-1910 in which Böhm-Bawerk, Clark, Fetter, Fisher, Veblen and Wicksell loomed large;
2. the Knight-Hayek-Kaldor debate in the 1930s and
3. the notorious ‘Cambridge’ controversies that erupted in the late 1960s and drew to an inconclusive close in the mid-1970s.¹

In retrospect these debates revealed a deep, unresolved issue: what meaning may be given to “the concept of capital in the analysis of industrial capitalist societies” (Cohen and Harcourt 2003:200)? There was irresolution on this matter not merely because the protagonists were posing different questions about capital, its formation, structure, measurement, its appropriate return and so forth. Instead the debates were underwritten by differences over the fundamental features or nature of capital. In other words, different sides in the capital debates held radically conflicting views on the ‘ontology’ of capital that were deeply embedded in economists’ discourse. (Economic ontology is broadly defined as the study of the fundamental nature and properties of entities in the economic sphere.) It has been demonstrated that economist’s discourse can be subject to descriptive, explanatory reconstruction to uncover divergent commitments on the fundamental

constituents of economic reality (Mäki 2001: 11-13). Wide differences over the meaning of capital in the literature of economics provide a good reason to attempt this task for one key item in the furniture of the economic world, namely capital.

While the three major capital controversies have been well documented, some important differences within schools of economic thought on capital have not been appreciated. In our ‘layer cake’ paper we take for granted some quite divergent positions on the nature of capital and its structure in the Austrian tradition from Menger to Hayek and Mises (Harper and Endres 2008). In surveying all ‘Austrian’ literature from 1900-1950, it is not until the appearance of Lachmann (1947) followed by a more comprehensive treatment in Lachmann (1956), that we find a return to the deep structural issues originally sketched in Menger (1871) and reinforced in Menger (1888). Menger offered the beginnings of a theory in which capital was envisioned as a hierarchically organized, structured combination of goods that were used to produce other goods. Among Menger’s followers and intellectual successors the works of Böhm-Bawerk, Wieser, Schumpeter, Strigl and Hayek and Mises all discussed capital and capital theory in some depth. While, as Erich Streissler (1969:250) maintained, all these Austrian economists were distinguished from other schools of thought by their common “structural mode of thinking”, there were undertones of strong disagreement in the Austrian tradition over the nature of capital. The disagreements were not amplified in discussion among the Austrians although they were significant in terms of their consequences. For there was sufficient noise in the Austrian literature on capital to garble the signal, that is, the distinctive elements in the approach to capital originally contributed by Menger. On the subject of capital and capital theory, important differences between Menger and Böhm-

2 Some of the economists were Menger’s contemporaries and successors. In respect of Böhm-Bawerk and Wieser, for instance, both were contemporaries of Menger and they were also successors in the sense that they explicitly referred to Menger (1871) as a source for the foundations of their own theories.
Bawerk have been investigated (Endres 1987; Garrison 1990) and between Menger and 
Wieser (Endres 1997:201-205). Peter Lewin (1994) has elaborated on some of the other 
differences within the Austrian tradition. In this paper our objective is to make the story 
more complete.

This paper is organised as follows. The next section delves into Menger’s philosophical 
and methodological directives for fundamental research on capital. Menger likened 
capital to a ‘genus” in a morphological sense. Section 3 gives some brief illustrations of 
some of the main differences between Menger’s concept and that of his principal 
successors in the Austrian tradition up to and including the publication of Mises (1949). 
Section 4 provides more detailed examination of Böhm-Bawerk’s capital concept. Though 
still retaining the Mengerian structural and realist elements, Böhm-Bawerk’s concept is 
not fully congruent with Menger’s notion of capital. In section 4 two additional case 
studies of capital concepts are offered as points of stronger contrast with Austrian 
contributions: John Bates Clark’s notion of capital as a perpetual, amorphous fund and 
Veblen’s concept of capital as a social artefact. Our conclusion in section 5 considers 
some of the causes and consequences of misalignments identified in various Austrian 
treatments of capital.

2. Some Mengerian Philosophical and Methodological Research Directives on 
Capital

One motivation for this paper is to respond to an ontological question originally posed by 
Menger (1985: 37n, 146-7) who refers to the general nature of capital and other 
phenomena constituting various fundaments of the economic world including economy, 
money, commodity, value, and price. Menger enquires as to the essential building blocks
of these fundaments, including capital. What is their “nature” and what causes their “movement”? Answering such questions was central to the goal of scholarly research [which] is not only the cognition, but also the understanding of phenomena. We have gained cognition of a phenomenon when we have attained a mental image of it. We understand it when we have recognized the reason for its existence and for its characteristic quality (the reason for its being and for its being as it is) (italics in original).

Following recommendations in this important passage for the case of capital, any redescription and reconstruction of various accounts of capital beginning with Menger, should be guided by the expectation that a Mengerian outlook will incorporate a degree of realism (“being as it is”). Mäki (1990b:294) maintains that Menger espoused “realism in different forms”; he was particularly insistent on “pursuing realisticness in economic theory”. Menger’s research directive is programmatic. It has been followed faithfully in modern literature that has produced illuminating descriptive ontologies of various economic phenomena, though capital has not yet figured among them (Zúñiga 1999; Mäki 2001, 2002). In addition to examining the fundamental character of capital, its constituents and relations to other economic entities, Menger’s directive invites us to consider the modes of existence of capital, namely, whether capital exists independently of the human mind, whether it persists and produces effects external to the minds of economic actors, whether it emerges spontaneously as the result of an invisible-hand process, whether it has the properties it has irrespective of economists' theorizing and representations about capital, and whether it can be reduced to more basic constituents of economic reality.

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3 Menger was a proponent of ontological realism in the sense that he presupposed an objective world “out there” and the objective nature of objects such as capital manifested in that world. The Mengerian position combined “ontic subjectivism and ontological objectivism. Ontic subjectivism says that the economy is at least partly constituted by individuals’ subjective valuations, expectations, purposes etc. Ontological objectivism says that the economy as the object of economic theories is unconstituted by those theories and exists independently of them” (Mäki 1990b: 294-5, original emphasis; see also Smith 1990: 265).
Menger (1883, 1985) specifically mentions, *inter alia*, a need to understand the existence and nature of capital. He called on economists systematically to study the morphology of economic phenomena including capital. It is proposed that we understand the morphology of an economic phenomenon when we recognize the grounds for its “being” and “being as it is” (“*der Grund ihres Seins und ihres So-Seins*”, Menger (1883:14)). Here we are treated to Menger’s brand of realism: it is expressed in the study of the form and structure of various economic fundaments, describing these “in all their complexity and multi-formity”. Morphological study must account for economic phenomena “as they are presented by experience”; it must reflect in part what is done in everyday life, that is, “full empirical reality” as found in the commonsense world (Menger [1889] 1994:12). That world needs to be investigated in order to uncover recurring characteristics and constituent elements (Menger 1985:86). Economic science first ‘reduces’ an economic phenomenon to its elements or its phenomenal forms (*Erscheinungsformen*) which, when they recur, are designated ‘types’ (*Typen*). All theoretical representations including typical connections between economic phenomena exist on different levels. At one level of understanding, we recognise similar, concrete elements (e.g. particular exemplifications). At a second level we construct representations of recurring relations between concrete elements or real types (e.g. generic instances). A third level contains representations of the most abstract elements or Menger’s ‘exact’ types (e.g. universals). It should be emphasized that the task of elucidating the third, abstract level is for Menger vital if we are to provide a full understanding of the nature of capital. For Menger (1985:147, 218), the third layer is concerned with “the phenomenon of abstract economic reality” such as “unintentionally…or ‘organically’ created social structures”. On this

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4 See Menger ([1889] 1994:13). Morphology (in biology) has a specific meaning: it concerns the study of the “form and structure of living organisms”. It is that “branch of biology that deals with the form of living organisms, and with the relationship between their structures” (Shorter Oxford English Dictionary 2002: 1834).
level, research is conducted to discover the “inner connections” (*innerer Zusammenhang*) and “inner causation” (*innere Verursachung*) of real things (Menger 1889: 190,192).

The Mengerian project involves considerable realism about capital. Its goal is to investigate the general nature of capital and its general connection to other economic phenomena (Menger 1963: 37). Capital is an economic type understood in the realist sense. Realism holds that economic types (general properties, relations, kinds) are entities that are really “out there” in the world, as general features of economic reality. Consequently, from a realist stance, capital exists at least objectively in that it exists independently of and is unconstituted by economists’ representations of it. Capital would come into being and continue to exist even if economic theorists were wiped off the face of the earth (dread the thought!). Moreover, when understood as an economic universal (i.e. type), capital makes a causal difference to the goods that instantiate it. Being capital brings extra causal powers – thereby inserting instances of it into cause-effect relations with other entities: “All things are subject to the law of cause and effect” (Menger 1950: 51).

The degree of complexity of the capital structure in a modern market economy is not limited to what an individual human mind or group of such minds can comprehend. In order to explain the capital structure and its nature, we need more than just everyday common-sense reasoning. We need to develop an economic theory that accounts for the real character of the capital structure and that identifies the relations existing between the capital combinations comprising the elements of that structure. This is the task of

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6 In line with ontological realism about capital, the Mengerian project subscribes to semantic realism. The economic theory of capital is semantically tied to things that really exist. In particular, Mengerian representations of capital refer to real entities – they are about the real aspects of things that really exist (capital goods, capital combinations and capital structures), and these representations can be true or false of the real existents referred to. Our paper can thus be seen as further corroboration of Mäki’s (1990: 292) claim that Austrian economic theories are “realistic in a very ambitious sense and that therefore a radically realist view of Austrian economics is defensible”.

theoretical economics. It is beyond any epistemic grasp based on common sense (Mäki 1990: 307).

For Menger (1985: 36), capital is an economic type understood as a universal. The capital type exists only in the tokens that instantiate it and it cannot exist separately from its tokens. The existence of the capital type is thus dependent on that of its tokens. (If the capital type did not have any empirical instances at all, it would not be a bona fide type and would not have real existence.) The capital universal cannot exist on its own, independent of particular things. It cannot float free from things but is firmly rooted in the spatio-temporal world. It is in each and every one of its tokens. Capital is always instantiated in individual objects (or first-order types considered as second-order tokens), whether capital goods, capital combinations or capital structures. Accordingly, the Mengerian economist denies that capital or other economic universals are causally inert, abstract entities or Platonic forms that exist outside the ordinary world of space and time. Capital does not bear the hallmarks of substance, whether considered as individual substances or substance types. Capital is not mind-independent. No objects of economizing and, hence no capital goods or capital combinations, are substances, where “substance” is defined in the technical sense as that which is logically capable of independent existence. A capital item cannot lack relations or relational properties. In Mengerian economics, relations and relational properties of a particular economic object (e.g. a concrete capital good) are as much a part of the being (nature) of that particular as

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7 It sounds peculiar to say that capital is a non-substantial universal, such as property or relation type. Our everyday language reinforces the view that capital is substance-like. We may place “capital” in the subject position of a sentence and make it the subject of predication (e.g. “Capital is scarce”). In English, capital (in the economic sense) has the grammatical form of a substantive (i.e. noun). Because it is not used in the plural, with an indefinite article or with cardinal number words, the English word “capital” (in the economic sense) has an uncountable meaning, it is a mass noun denoting a kind of stuff. However, in German, Menger’s mother tongue, “das Kapital” does have a plural – “die Kapitale” or “die Kapitalien” (which Menger spells as “Capitalien”) (1871: 131). In addition, Menger’s (1985: 36) references to the phenomenon of capital as an example of a “type” are suggestive of a universal substantial form, since the term “type” itself carries the implication of a kind of substance (Mäki 1990b: 481).
are its non-relational properties. For its existence, a capital good depends upon the existence of a use-plan and a judging mind. Capital goods must have a (perceived) causal connection to the satisfaction of a (perceived) human need and they must also be subject to the control of an economizing individual who can direct them to the satisfaction of that need (Menger 1950: 52, 303-304).

For example, Menger is quite explicit that goods-character, commodity-character, economic character and the character of being an order of a good are relation types (1950: 52, 58, 101, 102, 116, 240, 302). Menger states that goods-character, commodity-character, the order of a good and its economic character are “nothing inherent in goods” themselves, and neither one of them is a “property of goods”. In other words, he is saying that they are not substance types or essences. They are each “merely a relationship between certain things and men”, a specific, transitory relation between particular things and the economizing individuals who have economic control over them. When a specific relationship ceases to hold, the thing loses that particular character, so that the thing ceases to be a good, a commodity, a good of particular order, to be economic and so on. The goods-character, the commodity-character and so forth of this particular thing “comes to an end” – the relation is no longer instantiated in this particular case. Menger seems also to regard capital-character as a similarly contingent, loosely connected affair.

3. **Menger and His Successors: Brief Illustrations of Major Differences**

In this section we examine the principal differences between Austrian economists on the nature of capital. Table 1 summarises key points of theoretical divergence between
Austrian economists on this subject, only some of which have already been mentioned in the literature.

Firstly, let us refer to the second column in Table 1 below. Menger would not have appreciated major tensions amongst economists in the three capital controversies that turned on the problem of the “dual” nature of capital: on the one hand, capital as a collection of heterogeneous goods combined in a specific manner and, on the other hand, capital as a monetary fund of value distinct from capital goods themselves that moves more or less freely between alternative uses according to its market determined rate of return (Hennings 1987: 108-9; Cohen 2008:153). Menger (1888:43-45) resolves this ‘problem’ by distinguishing between two levels of reality: production activity and investment activity. Heterogeneous capital goods have a central place in the realm of production; when combined to form capital by entrepreneurs, they have a rate of return or yield. By contrast, money or financial capital is used for acquisitive purposes in the realm of investment and returns interest.
<table>
<thead>
<tr>
<th>Selected Texts</th>
<th>Real Production/ Monetary Investment Dichotomy</th>
<th>Existence of Original or Permanent Factors of Production</th>
<th>Measurable Aggregate Stock/Fund</th>
<th>Entrepreneur’s Appraisal Role Elaborated</th>
<th>Capital Specificity</th>
<th>Analytical Domain</th>
</tr>
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<tbody>
<tr>
<td>Menger (1871, 1888)</td>
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<td>Wieser (1889)</td>
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<td>✓</td>
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<td>Technical parameter</td>
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<td>Wieser (1914)</td>
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<td>✓</td>
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<td>Böhm-Bawerk (1889)</td>
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<td>×</td>
<td>Technical parameter</td>
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<tr>
<td>Schumpeter (1912)</td>
<td>✓</td>
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<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>Technical parameter and Unidirectional</td>
</tr>
<tr>
<td>Schumpeter (1939)</td>
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<td>✓</td>
<td>×</td>
<td>✓</td>
<td>Unidirectional</td>
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<tr>
<td>Strigl (1934)</td>
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<td>✓</td>
<td>✓</td>
<td>×</td>
<td>×</td>
<td>Technical parameter</td>
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<tr>
<td>Hayek (1941)</td>
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<td>×</td>
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<tr>
<td>Mises (1949)</td>
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<td>×</td>
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<td>Lachmann (1947, 1956)</td>
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</table>
Secondly, in respect of columns 3 and 4 in the table, Menger did not conceive of either ‘original’ factors of production or of capital as a measurable, homogenous aggregate or stock, but some of his followers notably Böhm-Bawerk ([1889] 1923) and Strigl (1934) demurred. Böhm-Bawerk accepted the classical-Jevonian assumption that the ‘original’ factor labour, with the assistance of land, produced capital.

Thirdly, the domains of analysis differed between leading Austrian economists (see column 7 in Table 1). For example, it is well known that Böhm-Bawerk, armed with the concept of “roundabout methods of production”, tried to measure the average amount of time capital goods spent in production (the degree of roundaboutness) before final consumer goods emerged. Time is used as a common thread structuring capital in the Böhm-Bawerkian economic system as a whole. It was an analytical procedure tantamount to turning heterogeneous capital goods into a single measurable stock (of congealed or past waiting) and reducing the plans combining those goods to a common denominator (Garrison1990: 140-4 and Lewin 1994: 210-13). Böhm-Bawerk therefore constructs a theory of the structure of production suitable for a steady state. The analytical domain was in fact restricted to a specific notion of time. As John Hicks (1976:139) remarked, Böhm-Bawerk, unlike Menger, contributed “an economics of time, in which time is no more than a mathematical parameter” (italics in original). In Menger’s work time is unidirectional. By comparison, in Bohm-Bawerk’s work time becomes a technical parameter of capital intensity. In his economics of time all moments of time become identical; there was no room for genuine uncertainty in the capital formation process (Lewin 1994: 212). Subsequently, the Böhm-Bawerkian conception of the capital structure of the economy “lent itself to the interpretation which focused more on the objective qualities and durabilities of physical things than on [entrepreneurs’] expectations and goals” (Kirzner 1996:11). Unfortunately this approach to
capital became known in the 1930s as the Austrian theory of capital in the Kaldor-Knight-Hayek controversy. As Nicholas Kaldor (1938:163) explained:

“The purpose of the Austrian or ‘time period’ theory of capital was to show that ‘capital’ is a distinct factor of production, which can be measured in homogeneous units, both in the production of particular goods and in the economic system as a whole”.

Nothing could have been further from Menger’s original vision of capital, its formation and its structure either at the micro-level or at the economy-wide level.

Fourthly, in respect of columns 5 and 6 in the table, Menger recommended decomposing (what for him were fictional) aggregates into their simplest, yet heterogeneous, structural characteristics reflective of the underlying economic realities (such as making the centrepiece of capital formation entrepreneurs’ forward-looking, heterogeneous plans and expectations). Schumpeter (1954:632) hesitated, offering the following warning:

“Naturally we wish for the purposes of pure theory, to reduce these structural characteristics to as few and as general ones as possible, steering as best we can between the Scylla of unmanageable lifelikeness and Charybdis of sterile simplicity”.

In his own work on economic development, Schumpeter (1912, 1934:66) demonstrated the importance of entrepreneurs’ acts for creating more highly production-specific capital by “combining” heterogeneous goods, although those acts were insignificant in the pure theory of the stationary economy. Schumpeter (1954: 631-2) underscored the value of investigating the structural characteristics of capital in a growing, non-stationary economy because heterogeneous capital goods, when used in specific combinations, “represent a structural quantity or a quantity that always displays structural relations within itself, that shape, in part, the subsequent course of the economic process”. This point is generalised and investigated empirically in his work on business cycles (Schumpeter 1939).
Like Menger, Schumpeter distinguished between real capital directly used in production and money or financial capital made available to innovating entrepreneurs by investing capitalists. Only the former was pivotal in configuring the economy’s overall capital structure in the long run. In all respects Schumpeter remained perfectly consistent with his teacher Friedrich Wieser. In Der natürliche Werth (1889), Wieser expounded a similar theory of the nature of capital and its functions firstly for the stationary economy case and secondly the “progressing economy” case, as Wieser called it in his Theorie der gesellschaftlichen Wirtschaft (1914).

A fifth point is that, in departing from Menger, Hayek (1941:58) gave approval to Wieser’s emphasis on the historical origin of resources. For instance, “original” resources such as natural features of topography, human temperament, climate and so forth were not admitted to the category “capital”. Only “non-permanent resources” requiring replacement or active reproduction could be combined to form capital. Those resources then became produced “instruments of production” (Hayek 1934:229). (See the third column in Table 1). From the outset Hayek follows Menger (1888) (and for that matter Marshall and Wicksell) by adopting a real-capital doctrine: he envisions capital as real, rent-yielding goods used in production rather than as a monetary, investment phenomenon yielding interest. However by contrast with Menger, the analytical domain of Hayek’s formal capital theory was fundamentally macroeconomic; it was designed ultimately for the analysis of business cycles (Hayek 1935, 1936, 1941). The specific, heterogeneous nature of capital combinations was a fundamental cause of cycles. He was willing to entertain some degree of Mengerian “unmanageable lifelikeness” (as Schumpeter called it in the passage quoted above) in order to capture the structure of capital in any real economy. In this he constructed a capital theory based on what
has been labelled a “comparative-equilibrium analysis” in which the structure and composition of the capital stock mattered for the explanation of business cycles (White 2008: xxxv). By contrast, to accept the Knightian concept of capital understood as a fully mobile “homogeneous mass” would be tantamount to contending there was no structure to capital whatsoever, which would not correspond to reality:

“The notion that capital…can at will and without any loss of value be transformed in any concrete form…would be true if the concrete capital goods were just so many units of homogeneous ‘energy’ which could be put to any use, i.e. if they were completely non-specific. But this of course corresponds even less to reality than the assumption of complete specificity. It seems reasonable to suppose that all the capital goods existing at any one moment are at least partly the result of an historical process which again and again has put existing capital goods to other uses for which they were originally intended” (Hayek 1934: 228-9, italics in original). 

Be that as it may, Hayek did not explain the process by which the capital structure is organised and in particular the micro-level role of entrepreneurs’ intentions, expectations and plans in that process. He recommended studying “the time structure of the stock of real capital” in order to explain its “organisation” and “the place of individual capital goods in this time structure” (Hayek 1934:231). The highly formal, aggregative constructions employed in Hayek (1941) were not meant for the task of micro-level process analysis. In retrospect he expressly deferred to his LSE student, Ludwig Lachmann, who had concentrated his effort on the micro-analytics of capital and its structure (Hayek 1994: 142). 

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8 Avi Cohen (2003: 477 n4) has demonstrated that the neoclassical production function fully accommodates Knightian capital conceived as a homogeneous mass; it denies the long run historical and economic significance of capital specificity: “Each point on the neoclassical production function represents an optimal capital structure built up ab ovo to match corresponding factor prices”. The assumption of capital as a homogeneous mass “precludes the need for historical analysis by allowing one to rewrite past history for each point”. 

9 Hayek’s use of the term capital had macroeconomic referents—namely to the theory of money and business cycles. Thus for Hayek the “term capital itself…will accordingly be used here to designate the aggregate of those non-permanent resources which can be used only … to contribute to the permanent maintenance of … income at a particular level” (Hayek 1941:54, italics in original) 

10 Lawrence White (2008: xxxv) refers to the “deconstructive” aspect of Lachmann’s treatment of capital and its structure as against Hayek’s (1941) penchant to abstract from these micro-level complexities.
Lastly, in the mid-twentieth century Ludwig von Mises (1949: 202,204) begins by arguing that capital is coextensive with all human action involving the production of something. Capital is itself a product of a goal-directed reasoning process and ultimately “its place is in the human mind” (p.500). Mises denies that “abstract or ideal capital” can exist apart from concrete capital goods (land, physical instruments of production and finance). Thus “capital is computed in terms of money…but capital can also consist of amounts of money” (p.517). He considers capital goods as “intermediary steps” in a production plan. By a mental process capital is therefore “embodied” in capital goods; it is a “praxeological concept” that involves forward-looking, logical appraisal linking physical entities (or intangibles) with some production goal (p.512). Mises is aware that at the empirical level the mental appraisal can be represented in an accounting statement or by a monetary pricing when capital is bought and sold in the market economy. At that level capital is represented as a sum of money determined in exchange.\textsuperscript{11}

In an actual production process, capital appears in the recurrent form of a definite composition of capital goods that are being transformed and/or depreciated. There is nothing independently “productive” about capital goods themselves since they are simply an unutilised store of nature, past labour and time (pp.488-90). Nature, past labour and time act as constraints on present human actions designing production plans. Mises reflects on the various relationships capital goods may have in a planned production process. Depending on the plan there will be a sequence and order in those relationships. Capital goods may be combined in many different ways and sequences. Plans to produce something create an “order” in the use of capital goods and the fact of use creates capital proper. Here he expands on his notion of “capital convertibility”: capital has a more or less “specific in

\textsuperscript{11} For Mises “capital is a mere shadow in economic systems in which there is no market exchange and no money prices of goods of all orders” (p.512). In another place he maintains that capital “makes no sense outside the conditions of a market economy” (p.202).
character”. Thus when entrepreneurs buy a machine they also buy “the original factors of production to be expended in its reproduction plus time, i.e., the time by which [the] period of production is shortened”. The capital goods that compose an entrepreneur’s capital are a result of human action, of an economic calculation, resulting in a “definite process of production” (p.500). The degree of specificity, the potential for convertibility (recombination) of the same capital goods, depends on the proximity of those goods to the desired final outcome of production. So, iron is normally “less specific than iron tubes, and iron tubes less so than iron machine parts” (p.500). Presumably users of iron may be able to ‘convert’ this material more easily (say, through innovating) than will users of less convertible items, such as machine parts.

Mises (1949: 202-4,488-90,500-512) can be said to have made a partial attempt to rehabilitate Menger’s ideas on capital though without much explicit acknowledgement of Menger. Mises dismissed the idea of the independent productivity of capital goods; these goods he considered as unutilised stores of nature, past labour and time.

“There is no question of the alleged productivity of capital goods. The difference between the price of capital goods, e.g., a machine and the sum of the prices of the complementary original factors of production is entirely due to time difference. He who employs a machine is nearer the goal of production. The period of production is shorter for him than for a competitor who must start from the beginning.” (p.505).
While possessing no productive power on their own, nature and labour are the ‘original factors’ of production. Time is an additional ingredient. So on this point Mises is closer to Böhm-Bawerk than to Menger.

For Mises capital was created in a temporal, entrepreneurial, capital-using production process logically dependent upon the structure of consumer requirements. However, that capital possesses a definite structure in Mises’ discussion seems partially due to physical features and objective factors embodied in capital goods more than to the creative mental acts of Mengerian-type entrepreneurs. Mises ([1931]: 1981:218) uses the term “inconvertible capital (Das festangelegte Kapital)”, to describe those combinations of capital goods delimited by what is regarded as “technologically possible”. Technological possibilities have an overarching objective existence and are represented by a specific, unchangeable combination of capital goods used in a production process. Mises’ notion of technology is not concerned with knowledge of functions given in certain capital goods; it incorporates nature’s limits such as immutable physical structures (e.g. he includes topography and climate), already committed labour and a production time-structure immanent in a produced capital good.

4. Significant Contemporaries of Menger on the Nature of Capital: Three Case Studies

Our objective in this section is to consider representative cases of Austrian, Neoclassical and Institutionalist approaches to capital among Menger’s contemporaries. We choose three major contributors respectively: E. Böhm-Bawerk, J. B. Clark and T. Veblen. Both Clark and Veblen took Böhm-Bawerk’s capital concept more seriously than Menger’s possibly because Bohm-Bawerk integrated his concept in a more complete theory of capital and interest (by
comparision with Menger). Accordingly Böhm-Bawerk’s was the most recognised and most influential ‘Austrian’ approach; his main analytical conclusions were more attractive to contemporaries outside the Austrian tradition because of what they probably saw as Menger’s obita dicta on the subject. The debate between Bohm-Bawerk and Clark on capital concepts is instructive insofar as it illuminates how both writers differ from Menger’s ideas on the subject. The same comment applies to the reactions of Veblen to Clark’s ideas and Veblen’s alternative concept.

Case I: Böhm-Bawerk

Böhm-Bawerk followed Menger’s vision of capital only to a limited and quite superficial extent (Lewin 1994: 210-12; Endres 1997: 162-70). He envisions a time structure of production in which capital plays a role. However, this structure differs from Menger’s. Unlike Menger, Böhm-Bawerk proposes that all capital goods must be concrete instruments of production: “I know no capital other than concrete goods which constitute it; and I believe the world of facts knows no other”. So capital at the ontological level of empirical patterns (classified entities) consists in “mills, looms, ploughs, locomotives” (Böhm-Bawerk 1895: 21). Capital is defined not by its perceived, prospective value in the minds of entrepreneurs; it is instead defined by its completely objective, external manifestations and given functions. For example, those functions are to variously “grind corn, spin yarn or plough up land or carry a load” (Böhm-Bawerk [1889] 1923: 58, 63-4, 76). This vision is not forward-looking insofar as it takes for granted both the mode of use of specific capital goods and future consumer valuations for the outputs (corn, yarn, the produce of ploughed land, transport services etc) of capital.
In terms of actual patterns of events, production may be observed to take place over varying stages; it may exhibit a “roundabout” rather than direct character. Stages of production and hence the nature of capital in production are determined by the “technical nature” of the heterogeneous instruments of production (Menger’s capital goods). Böhm-Bawerk ([1921]1959: 107) characterizes the degree of roundaboutness of production in terms of a time structure. Capital will be composed of specific sets of capital goods (e.g. a set comprising a set of highly integrated things in a steel mill) and the time period for delivery of outputs will be given relative to other modes of steel production. As well, the time period for the use of any set of committed capital goods before they completely depreciate will also be given. A steel mill production set will enable a longer period of production and may be superior to other capital goods-sets simply because it can produce more output for longer.

The use of capital is undertaken at one remove from the everyday, commonsense notion of capital as a productive sum of money. The structure of capital is manifested in the technical functions and vintages embodied in capital goods. These vintages are not caused by mental entities, that is, by entrepreneur’s representations and imaginings concerning modes of possible use and the prospective value of outputs. Certainly, entrepreneurs can alter the mode of production and the distribution of capital goods in a production process since they are continuously making multi-period, alterable plans (Böhm-Bawerk[1921]1959: 112). However, the forward-looking element in Böhm-Bawerk’s multi-period analysis of capital is only superficial. Inside every capital good is a natural, technical function waiting to be born. Böhm-Bawerk’s entrepreneur acts as a midwife for the forces of nature—the “originary productive forces” embodied in all capital goods (Böhm-Bawerk [1921] 1959: 95).
As for the role of time and the time structure of production in Böhm-Bawerk’s scheme, it is both contained in, and derived from, the specific functions of a capital good. His conception of “time” implies objective historical “lock in” by dint of the roundabout functions of durable capital goods, as if the goods could not be scrapped or used for different purposes not intended by their original design. A durable capital good used in a production process would embody not only the original forces of nature; it would also contain time in two senses. It takes time to convert natural forces into durable capital goods and time to use those goods to produce consumer goods. Time is a measurable, corporeal element contained in any capital. Capital in this view is “congealed waiting” (Kirzner 1996:82). Once the capital good is formed it determines a production period; capital is therefore an aggregate stock (of past waiting) governing the future course of the economy. If entrepreneurs’ forward-looking dispositions are evident at all, for instance, as in expectations of future consumer valuations of the products of capital, these expectations are regarded as constant (Lewin 1994:212).

Lachmann’s (1956:79-80) assessment of the role of time in Böhm-Bawerk’s scheme is also pertinent here. Two major objections are entered that have Mengerian connotations. Firstly, time was allowed for in Böhm-Bawerk’s well known “roundabout” notion of capital; durable capital possessed “productiveness” that extended over time. Böhm-Bawerk’s capital possesses features of order in time but it is descriptive of a world where “knowledge is equally shared by all” entrepreneurs; it is an entirely predictable “world of restricted progress, of progress in only one direction” exclusively dictated by the roundabout, technical functions embodied in durable (thus often indivisible) capital goods (p.79). Secondly, Böhm-Bawerk overlooks the point that “complementarity plus indivisibility” are necessary for capital making (Lachmann 1956:80, his emphasis). A durable, indivisible, capital good will normally lengthen a period of production and promote higher productivity. Such a
roundabout production process is time consuming. Yet the fact that time is consumed is not the defining characteristic of capital. Time is indeed a dimension of capital though “by itself it is not productive, nor is any human action necessarily more productive because it takes longer” (p.84). A capital good could easily lose its “capital character” and become scrap in a plan that is extended in time and that is imperfectly referenced to, and yet intricately connected with, the plans made by others (p.80). So there is nothing entirely predictable about the nature of the capital structure of an economy dominated by a long, complex, changeable assemblage of production processes that use so-called Böhm-Bawerkian “‘original factors’ … [and that] change their physical shape on their journey towards the consumer”. Capital does not always imply a definite, invariant time period of production; it may lead to production processes varying in time and with economic progress.

Böhm-Bawerk’s “capital” is always a product of other things: nature and labour. He separates private capital from “social capital”. The latter is a stock of all possible and available capital goods; it has completely independent existence and resides in a “natural store” (Böhm-Bawerk[1921] 1959: 63-4, 74). Here in the most abstract representation, Böhm-Bawerk attributes capital status to anything that conceivably has an inherent, natural capacity to produce something. In summary, at the deepest ontological level Böhm-Bawerk’s capital concept is founded on the idea that capital has productiveness that in turn is the result of the external, indestructible offerings of nature and waiting. Altogether, it is scarcely surprising that Böhm-Bawerk’s notion of capital and its structure should be regarded as a quintessential neoclassical contribution because it aligns so well with the view of capital as it is incorporated in the standard neoclassical production function (Kuenne 1971).
Case II: J B Clark-- Capital is a Perpetual, Amorphous Substance

At least in one respect, more like Menger than Böhm-Bawerk, John Bates Clark believed capital was something other than merely the product of nature and labour. While concrete things constitute capital, capital is something much more than a stock of potentially combinable things. Clark (1888) demonstrates full awareness of the commonsense notion—capital is a sum of money invested in capital goods such as land, buildings, machinery and so forth. Capital may be considered as a quantum of value such as the capitalized present value of the future net products of capital goods. That capital is productive and yields a net product, often represented as a monetary sum such as rent or interest, is assumed rather than proven. It is an assumption deriving from the empirical realm. Capital goods may be different but their value can be aggregated.

Böhm-Bawerk (1907:253,255) vigorously disputed Clark’s assumption. The presumption of capital possessing independent, objective productivity (from nature and labour) is implicit in Clark’s discussion. Since for Böhm-Bawerk present capital goods are produced by the combination of past labour (and nature), the net product or value for current “cooperating capital goods” is not so straightforward to compute, and certainly not so easy to represent as a mere quantum of value. On the most abstract ontological level, to conceive of capital as a separable “fund of value” is without warrant; it gives capital certain “magical qualities”.

John Bates Clark attributes economists (and sophisticated capitalists) with an ability to think on a much deeper level about the nature of capital. In the most abstract sense, capital is represented “as a fund that is permanently [owned], though it may not retain for a single day

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12 It was Irving Fisher (1906:202,328-30) who first formulated the notion of capitalization, defining capital value as the discounted “present worth of the future income from the specified capital”. For Fisher almost any physical thing or intangible may conceivably be “specified” as long as it could be capitalized.
its exact present form of embodiment” (Clark 1888: 9). Since capital goods depreciate they must be replaced by reinvestment. Capital, at least in the sense it is employed in economic science, is conceived as “an abstract fund, the destiny of which is to migrate through an endless series of outward forms” (p.10). Now this definition does not gainsay outward, external manifestations of capital in the minds of its owners who may see and represent their capital in terms of material assets. Capital is indeed commonly conceived as a collection of productive instruments, a quantum of wealth and so forth but at a deeper level it is a perpetual fund or substance embodied in the chosen material instruments that produce goods. This substance resides “longer in some forms [of capital goods] than in others. It remains for an instant in steam, and for an hour in the fuel that generates it. It stays for weeks in unfinished products and for years in the machinery that makes them” (p.14-15). Clark insists on economic science using this “primary notion of capital” as a permanent “substance”. A complete theory of capital could not, in his view, otherwise be developed.

Böhm-Bawerk (1907:280,282) took the view that Clark’s ontology of capital was not based on realistic foundations; it was not consistent with the “facts”. Clark had produced a “mythology of capital”; he “strips off everything which may suggest material existence, and retains only a value jelly, existing externally, never destroyed”. By contrast Frank Knight (1916:282n) regarded the Clarkian concept as a virtue because it gave capital a “metaphysical essence persisting through material forms”. Moreover, according to Knight (1933:338), Clark’s idea rendered capital “inherently immortal” in a growing economy.

Doubtless Clark comes close to apprehending capital as a macroeconomic phenomenon in that he represents capital in an economy as a whole as an amorphous substance that is perfectly mobile and can be valued. This substance is ultimately a quantum of value which
“imparts utilities” to gratify the “nervous sensibilities” of those who consume the products of capital (Clark 1899: 144,150). To be sure, there is an assumption of one-way causation in all this. The physical features of capital goods, such as machinery, vehicles, buildings, are combined in a process that makes use of useful elements furnished in nature. Some capital goods actively “subjugate” nature whereas others (e.g. cotton, raw materials, grain) are passive elements in production. That production may take time is a truism for Clark. The passage of time has no significance for the most abstract notion of capital since true capital is a permanent, mobile, impalpable substance. Correspondingly, the changing structure of production represented by an “endless series of outward forms” in capital goods, their mode of use, their depreciation and reproduction, is irrelevant for developing a scientific understanding of the “true” nature of capital (pp.143-44).

Case III: Veblen on Capital as a Social Artefact

The institutional economist, Thorstein Veblen, also reacted to Clark’s capital concept in a manner quite similar to Böhm-Bawerk. Veblen objected to the dearth of ontological realism in Clark’s “permanent substance” idea. For Veblen, Clark’s capital was a fiction. Capital must instead be conceptualised as an artefact primarily of social–anthropological significance. In the capitalist exchange economy, capital reflected “a habit of thought of the men engaged in business [and] more or less closely defined in practice by the consensus of usage in the business community” (Veblen 1908b: 113). There were “material forces” in existence for all humans to consider and use though Veblen avoided saying that these forces were original or permanent factors of production. (1908b:542).
Three ontological levels are distinguishable in Veblen’s alternative to Clark’s concept. Firstly, participants in everyday business activities “know what the term [capital] means to them”; it was always for them a monetary phenomenon computed according to some habitual accounting standards.\(^\text{13}\) Capital in this view is something that has income-yielding capacity and can be “capitalized” (p.111.121). So far this view accords with Clark (and Irving Fisher). Secondly, capital was the outcome of a convergence of habits, a consensus of minds that matters in creating and recreating capital. Capital does not exist independently of some social mind. Capital possesses characteristics that are emphatically “not physical marks”, that is, it does not have external, objective existence (p.114). Long-term changes in the organization of the monetary exchange economy, changes in the social context in which capital is thought of and calculated over, necessarily changes habits of thought and the consensus over its meaning. The processes involved in the formation of consensus remain opaque in Veblen’s treatment. Third, in the most abstract realm capital transcends and pre-dates capitalistic forms of economic organization and calculation; it also pre-dates modern accounting methods turning on the notion of capitalization. Capital is conceived as congealed knowledge (contrasting quite nicely with Böhm-Bawerk’s idea of congealed waiting and Marx’s notion of capital as congealed labour). Capital in Veblen’s view is the knowledge of technical functions in the sense of “ways and means” already embodied in the chosen instruments of production. Such knowledge is built up from long experience and experimentation; it is society’s “technological heritage”. Alternatively stated, capital is the “stock of knowledge and practices…perhaps held loosely and informally” in a particular community; as a macro-social phenomenon it was fundamentally intangible (Veblen 1908b: 519, 521, 535-6).\(^\text{14}\)

\(^{13}\) So long as business calculations in monetary terms over the instruments of production turn those instruments into accounting “assets” then the items that form capital may assume a tangible or intangible form (Veblen1908c: 116-7).

\(^{14}\) Veblen proceeded to explain that capital, in its most abstract form, is the “immaterial residue of the community’s experience past and present…[and] has no existence apart from the community’s life” (p.539-40).
It could be maintained that all the instruments of production would not be regarded as conceivable without the stock of technical wisdom, the pivotal knowledge of functions making production possible. Veblen (1908b:540-42) relegates capital goods to the stock of “raw materials”, the land, minerals and the “brute energies of mankind”. These may become “valuable property and may be counted among the assets of a business. But the value which they so have is a function of the anticipated use to which they may be put, and that is a function of the technological situation”.

From a Mengerian perspective, Veblen’s “knowledge of ways and means” and “common stock of immaterial assets” (Veblen 1908b:532), are all about function and that knowledge of function is another capital good rather than capital proper. If Veblen’s knowledge extends to knowing how to create combinations of capital goods with a specific economic purpose in view, then there is no way such knowledge can be embodied in the physical goods chosen. In addition, at any time Veblen’s capital is a stock of knowledge; there is an existing quantum of capital even though it is ‘immaterial’. This notion of capital implies a minimal role for human agency. Moreover, Veblen’s concept does not capture the time structure and layered nature of capital that distinguishes Menger’s concept.

5. Summary and Conclusion

What then are the main factors explaining the quite different approaches to capital in the Austrian tradition from Menger (1871) to Lachmann (1956)? Certainly we can agree with Kirzner’s (1996:43) general observation that

“The multiplicity of different formulations of the capital concept attest not only to the elusive nature of the concept itself, but even more importantly, to the
"innate complexity of the economic relationships hoped to be elucidated with the aid of this concept, or rather these concepts."

Menger offered some programmatic directives on the way economists should formulate their fundamental concepts by asking what they refer to in reality. The Mengerian directive was to start by explaining capital in terms of its nature, existence and its real elements of shape, form and structure.

All the Austrian economists surveyed here formulated capital concepts with a broad structural idea in view, that is, they based their work on the Mengerian idea that the term capital referred to the “order of goods” in actual production. Armed with this deceptively simple idea, they all penetrated to the heart of the complexity of capital, as they understood it, and its associated relationships with other economic phenomena. For the Austrians, the elemental building blocks of capital possessed a fundamental hierarchical make-up. The majority of the writers surveyed above considered this make-up irreducible; it was not an amorphous mass. Increasingly as they absorbed other traditions of thought on the subject, or became enmeshed in contemporary debates with the Clark-Knight or neoclassical view of capital, later Austrians modified Menger’s original doctrine. Often they were faced with adopting different assumptions because the domains of their analyses were extended beyond Menger’s interest in the micro-analytics of capital.

In the twentieth century, a growing desire to envision an aggregate commonly called “capital stock” was supposed to assist the measurement of the degree of capital intensity in industries and in the economy as a whole; it also supposedly enabled economists to trace movements of the “stock” in macro-dynamic studies of business cycles. Whether or not specific measures of capital were proposed by Austrian economists, this desire is reflected in the work of Böhm-Bawerk and Strigl and indirectly in Schumpeter’s empirical work on business cycles.
The motivation to accept some notion of capital stock may have been to repudiate the idea that capital is just an arbitrary collection of goods used to produce other goods. In the Menger-Lachmann line of thought on capital, the purposes, valuations and actions of entrepreneurs in fact give capital an ordered rather than either an aggregative, ‘stock-like’ form or an arbitrary appearance. That individual valuations (and thence expectations) are inconsistent makes it difficult to use these as the foundations for deriving meaningful aggregate measures of capital; capital is not meaningfully reducible to a single measure either in terms of a macro fund of value, labour time units or time units per se. Moreover, inconsistent valuations are necessary for the creation of new capital and the scrapping of old capital goods.

The rehabilitation of Menger’s ideas in Lachmann (1956) is clear from their perfect alignment on all the dimensions in Table 1. Nevertheless three major distractions from the micro-structural issues raised by Menger’s approach became evident in the twentieth century: (i) the need for a capital concept suitable for business cycle research and macro-dynamic problems; (ii) reasoning in terms of the “capital stock” in industries or in national economies as a whole; and (iii) growing twentieth century empirical concerns with macroeconomic and national aggregates in which capital became a counterpart of quantifiable aggregates such as savings and investment. In some ways these research preoccupations retarded the development of Menger’s original vision.

One of the more unfortunate consequences of allowing far greater alignment with both macro-dynamic empirical work and neoclassical, Clark-Knight approaches was progressive blurring of several unique Mengerian insights. Chief amongst these insights is the view that capital is always in reality a structure as opposed a structureless, malleable, mobile substance.
that could be subject to a single measure. Capital in the Mengerian system was formed in an entrepreneurially driven process. The analytical context was a non-stationary economy in which markets were in a continual state of disequilibrium. In these conditions two seminal Mengerian ideas commend themselves: the hierarchical (or layered) “order of goods” in a production structure and the notion of diverse and changeable capital specificities.
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