



Munich Personal RePEc Archive

Uncertainty and Expectations in Shackle's Theory of Capital and Interest

Meacci, Ferdinando

University of Padova

26 June 2006

Online at <https://mpra.ub.uni-muenchen.de/11700/>
MPRA Paper No. 11700, posted 23 Dec 2008 05:46 UTC

UNCERTAINTY AND EXPECTATIONS IN SHACKLE'S THEORY OF CAPITAL AND INTEREST*

by

FERDINANDO MEACCI
Dipartimento di Scienze Economiche
Università di Padova
Tel. +39 049 8274270 Fax +39 049 8274221
Email: ferdinando.meacci@unipd.it

“In natural science, what is thought is built upon what is seen: but in economics, what is seen is built upon what is thought” (Shackle, 1972, p.66)

1. Introduction.

When the history of economic theory in the 20th century is written, Shackle may emerge as an interpreter of what this theory *was* about in the first half of the century as well as the pioneer of what it was largely *not* about in the second half. While the interpretation of what occurred in the first half of the century is provided in Shackle's book *The Years of High Theory* (1967), the contribution to the economics that largely failed to materialize in the second half is provided in his subsequent book *Epistemics and Economics* (1972). These books may be regarded as a *summa* of Shackle's work on uncertainty and expectations ever since he started his studies in the 1930's¹.

The stream of theory discussed by Shackle was launched in the 1920's by Knight's *Risk, Uncertainty and Profit* (1921) and Keynes's *A Treatise on Probability* (1921) and was extended in the 1930's to the rising branch of macroeconomics and to “period analysis” as a crucial component of this branch. This extension was implemented by Myrdal's *Monetary Equilibrium* (1939) and, through the controversies raised by Hayek's *Prices and Production* (1931) and subsequent publications, by Keynes's *General Theory of Employment, Interest and Money* (1936) and by Hicks's *Value and Capital* (1939, Part III and Part IV).

The scope of this paper is to focus on the macroeconomic extension of this stream. The focus will be placed, within this extension, on the new view of time and the resulting theory of

* I wish to thank G. C. Harcourt, the participants to the 3rd STOREP European Summer School in Brixen for their helpful comments and suggestions. The usual disclaimer applies.

¹ For an overview of Shackle's life and publications, see Ford (1993) and Shackle (1983).

capital and interest that was developed in those years. The paper proceeds as follows.

Section 2 focuses on Shackle's account of the conflict between the new theories of the "Age of Turmoil" (the 1930's) and the old theories of the "Age of Tranquillity". In this section it will be argued that the conflict runs between two sets of theories so different from each other that they can be regarded as two Paradigms: the General Equilibrium Theories (GET Paradigm) and the Economics of Uncertainty and Expectations (EUE Paradigm). The replacement of the old Paradigm, it will be argued, amounts to the replacement of the general framework of "logical" (or no) time by the new framework of "historical" time. After Marshall, who was not unaware of the importance of this framework, it was Keynes who brought that replacement to completion.

Section 3 investigates Shackle's account of Myrdal's *ex ante/ex post* distinction as a central product of the new Paradigm and as an indispensable tool for the macroeconomics of the new period. Shackle's analytical insight and linguistic elegance are shown here to converge to highlight the flaws and limits of Keynes's system of thought (the most advanced system of the Age of Turmoil) as well as of its degenerations into the "Keynesian hydraulics" of the following years.

Section 4 deals with the replacement of the theory of interest, as developed in the Age of Tranquillity, by the theory of the *money* rate of interest, as developed in the new age. This section shows how this replacement goes hand-in-hand with a sophisticated development of the notion of money as a store of value (a crucial idea of the EUE Paradigm) and of the roles assigned to uncertainty and expectations in determining the equilibrium money rate of interest and its changes from period to period.

Section 5 is an attempt to link the new theory of interest (more properly: of the money rate of interest) to the Austrian theory of capital as re-deployed by Shackle. Here it is argued that Shackle's re-deployment suffers from the same general limits of his own theory of interest (or account of it) as shown in Section 4, i.e. from his overemphasizing the neglect of historical time in the Austrian theory; a neglect that it was up to Hayek (as acknowledged by Shackle) to overcome.

Section 6 provides some concluding remarks on the strengths and weaknesses of Shackle's contribution to economics and the history of economic theory. It is argued that the strengths overwhelm the weaknesses and that current macroeconomics has failed to take advantage of these strengths.

2. The conflict of Paradigms: GET vs. EUE

Isaiah Berlin’s dictum that “the fox knows many things, the hedgehog knows one big thing” is used by Shackle (1967, p.135) to identify the structure of Keynes’s “long struggle of escape from habitual modes of thought and expression”. According to Shackle, the “many things” of this escape are the particular notions and arguments (such as the postulates of classical economics or the three fundamental psychological factors of Keynes’s *General Theory*) that Keynes aimed respectively to eliminate from, or to introduce into, our “habitual modes of thought”. By contrast, Keynes’s “one big thing” is the acknowledgment of men’s inescapable ignorance of the future and its impact on the “nature of decision in general and therefore of the decision to invest” (1967, pp.135-6)

What Shackle here calls “decision in general” and “decision to invest” can be investigated at the level either of an individual agent or, if one looks at the interaction between the decisions of all agents taken together, of the economy as a whole. Shackle pursued both lines of research (in his 1969 and 1979 books, for instance, he is concerned with the former line whereas in his 1967 and 1972 books he is concerned with the latter). In both cases, however, the decision-making that is investigated is decision-making *in time*². However often the term time is used in Shackle’s work, it is never specified whether this is *historical* or *logical* time in J.Robinson’s sense (1962, 1974)³. Yet the time that lies at the roots of Shackle’s thought is unquestionably

² The expression “in time” is here used in the sense of Hicks when he writes that “Menger’s theory is an economics *in* time but Bohm’s is an economics *of* time” (time being, in the latter case, “no more than a mathematical parameter” (1976, p.139). It is interesting to note that Hicks regards Menger’s own theory of liquidity as a clear indication of a theory *in* time (see below note 7) and therefore as a forerunner of Keynes’s “marginal efficiency of capital” and “liquidity preference”. These notions are indeed *in* time although, as Hicks argues in Shackle’s (unrecognized) footsteps (see below §3, bottom), “Keynes’s theory has one leg which is *in* time, but another which is not” (*ibid.*, pp.139-40). Given Shackle’s two lines of research indicated above, Hicks’s insight may be extended to Shackle by arguing that *both* legs of Shackle’s theory are *in* time. On Shackle’s first line of research, see Lachmann (1990).

³ Shackle does indeed distinguish between “time of mechanism” -or *mechanical time*- and “time of uncertainty” -or *expectational time*- (to which he adds *Marshallian evolutionary time*) and ranks economic theories in terms of whether these are based on one or another of these notions (1965, Chapter VII; see also 1967). His “mechanical time” is much the same as J. Robinson’s “logical time” while his “expectational time” corresponds to the latter’s “historical time”. Since J. Robinson’s distinction has gained ground in economic literature (see, for instance, Vickers, 1994) while the term time is often used by Shackle without any adjectives, in this paper we will adopt J.Robinson’s wording. The scope of J.Robinson’s distinction has been summarized by Harris (2005) in the following terms (the “substitutability” and “specificity” mentioned in row 5 may be better rendered by the terms “homogeneity” and “heterogeneity”):

	Logical Time	Historical Time
1. Directionality of time	Reversibility	Irreversibility
2. Time intensity of action	Instantaneous	Discreteness, lags; inertia
3. Expectations	Self-realizing, correct foresight	Falsifiable, future unknowable
4. Information/Knowledge	Complete, free, symmetric	Imperfect, costly, local learning
5. Capital goods	Substitutability	Specificity, lumpiness
6. Investment	Elastic	Inertia, driven by animal spirits
7. Technical change	Disembodied	Embodied, path-dependent

historical time. It is this, not the other, sort of time which is a vehicle of *Novelty* and the source of *Uncertainty*. And it is this, not the other, sort of time which accounts for our ignorance of the future and our inability to manage it by the use of *Reason*. Hence the contrast between *time* and *reason*⁴.

This contrast lies at the roots of the schism that gave rise to the economics of the ‘years of high theory’. It was in those years that economists turned away from the application of *reason* (the fountainhead of equilibrium economics) and focused instead on the complications entailed by (historical) *time* (the fountainhead of disequilibrium economics). These two approaches are so alien to each other that we can regard the resulting theories as corresponding to two different “Paradigms”. While the Paradigm that prevailed in the “Age of Tranquillity” was focused on logical time (or on no time at all) and culminated in General Equilibrium Theory (GET Paradigm), the Paradigm that prevailed in the “Age of Turmoil” was focused on historical time and culminated in what will be called in this paper the Economics of Uncertainty and Expectations (EUE Paradigm). The rise and fall of the GET Paradigm are brilliantly illustrated in Book II, *The rise of the rational ideal*, and Book III, *The dissolution of the rational ideal*, of *Epistemics and Economics* (1972). What is called in this book “rational ideal” is nothing but the GET Paradigm while what is called the “dissolution of the rational ideal” is nothing but the dissolution of this Paradigm. Shackle’s argument, however, is worded in such a manner that it is unclear whether this dissolution is an *absolute* event (in the sense that the GET Paradigm is an *unfortunate* episode in the history of our discipline) or only a *relative* event (in the sense that the GET Paradigm is rather a *necessary* episode in this history)⁵. If it is a relative event, Shackle’s “dissolution” should more properly be understood as a change in focus resulting from an advance in the intergenerational division of labour among economists. But, even in this sense, the term dissolution is partially justified for it was in the 1930’s that the main assumptions, methods, notions and purposes of the GET Paradigm were abandoned to the benefit of the alternative assumptions, methods, notions and purposes of the new Paradigm. These alternative features can be ranked and highlighted as follows:

8. Money/Finance	Barter, passive money, complete futures markets	Active money, liquidity preference, incomplete markets
------------------	---	--

⁴ “Time is a denial of the omnipotence of reason. Time divides the entirety of things into that part about which we can reason, and that part about which we cannot. Yet the part about which we cannot reason has a bearing on the meaning of the part that is amenable to reason. Then analyst is obliged to practice, in effect, a denial of the nature of time. For he can reason only about what is *in effect* complete; and in a world where there is time, nothing is ever complete (1972, p.27; see also *ibid.*, p.254).

⁵ Shackle’s view of the relative importance of the two events is expounded in his introduction to Fossati (1957; also in Shackle, 1956).

GET PARADIGM: Logical (or no) time → Static Method → Reason → Perfect Knowledge (Foresight) → Partial Equilibrium → General Equilibrium.

EUE PARADIGM: Historical time → Dynamic Method → Uncertainty → Ignorance (Unknowledge) → Expectations → Money → Fluctuations.

The contrast between the two Paradigms starts with Shackle's argument that economics presents itself, according to the GET Paradigm, as the science of *scarcity* whereas it presents itself, according to the EUE Paradigm, as the science of *uncertainty* (1967, p.7 and p.146). This argument proceeds as follows:

“Economic theory has asked two questions: How will things happen? What will things be like? The former leads to a study of diachronic forms, of a series of situations growing in some sense one out of another and thus composing a unity spread along the calendar. The latter leads to the construction of an exact, encompassing, timeless adjustment. Our purpose is now to consider this contrast of method and of the insight which the two methods seek. Both methods, in the nature of things, must study *what is* at some (one or more) *moment*. For existence is existence at a moment, the moment of existence is solitary and by itself. In the diachronic method, however, what exists is assumed to have, as a whole, such a character that it must transform itself into something different in the next moment. In the synchronic method, transformations have merely a potential existence as a background to throw into relief the adjustment which has been attained” (1972, p.89).

The two questions above can be assimilated to the questions 1) as to how water runs from a hill into a lake (how will things happen?) and 2) as to how the same water disposes itself into the lake (what will things be like?). The static method is as necessary for answering the latter question as it is in closing the GET Paradigm with the notion of (partial or general) equilibrium:

“Rational conduct is that which is demonstrably the most advantageous open to the individual in view of his circumstances. In order to demonstrate its superiority, even if he can do so only to himself, he must know what those circumstances are. Knowable circumstances can be those only of an immediate present. Situations and events removed into the future are not observable, and thus not knowable, for there is no proof of any rigid implication of the future by the past, and such an implication would contradict the notion of origination choice. Rational conduct is thus confined to a timeless or a momentary world. The circumstance which will affect the outcome of given conduct include the actions of other individuals. In order that each person may choose his conduct in effective knowledge of the contemporaneous choices of others, there must be pre-reconciliation of all choices by means of a declaration and pooling of conditional intentions” (1972, p.53)⁶.

Since, however, knowledge changes “as soon as we permit time to elapse” (Lachmann, 1959, quoted by Shackle, 1972, title-page), it follows that the introduction of historical time implies

⁶ This timeless pre-reconciliation of choices is the general feature of the GET static method and, by derivation, of general and partial equilibrium models. But it is also implicit in the long-period assumption, however incompatible this might seem to be with the static method.

the abandonment of the assumption of perfect knowledge of other people's -and even of our own- "conditional intentions". Hence the dissolution of the GET Paradigm and the rise of the EUE Paradigm. Hence the emphasis of the EUE Paradigm on uncertainty and expectations as well as its reliance on *period* and *process* analysis⁷.

Once uncertainty and expectations are introduced into the picture, money itself must be accommodated in a new guise. Prior to the years of high theory, money was usually regarded in economic analysis in its familiar aspects of unit of account (*numéraire*) and means of payment. Indeed, when economic theory was concerned in the classical period with the fundamental question of the nature and causes of the wealth of nations (the "Classical Paradigm") or, over one century later, with the very different question of general equilibrium (the GET Paradigm), money could well be regarded as "a sort of mechanical device running at its own speed" (1972, p.12). But when the focus shifted to the EUE Paradigm (in which time is permitted to elapse and knowledge to change), money came to be regarded in its additional aspect of a *store of value* and, therefore, as a further link between uncertainty and economic behaviour (both at the individual and at the aggregate level)⁸:

"Money, as something which can introduce a time interval between selling one thing and deciding what to have in exchange for it, can evidently have no place in a system whose logic requires all its choices to be comprehensively simultaneous in order that they may be pre-reconciled and thus fully informed. Money is the means of stopping half-way in the complete transaction of exchange, the means of avoiding or postponing the hazardous and expectational choice of a concrete, specialized asset whose value is a conjecture about the relation of its design to future technology and markets. *Liquidity* is a denial of the rationality of the only economic world we have evolved" (1972, p.164)⁹.

⁷ For another review of the essential differences between the two Paradigms, see Shackle, 1965, Chapter VII. On the idea that "expectation and determinacy are incompatible and mutually exclusive" so that "the rational ideal must exclude expectation", see Shackle, 1972, Chapter 16. The transition from "period" to "process" analysis is a further step in the development of the EUE Paradigm. As is well known, this transition was promoted by the Swedish economists of the 1930s and is particularly needed when the focus is on the macroeconomic consequences of any discrepancy between the *ex ante* and *ex post* magnitudes of a given period. On the importance of this transition in economic analysis when the economy moves from one structure of production to another, see Lachmann's (Hayekian) treatment of malinvestment and the revision of plans (1978, pp.13-15 and Chapters II-III).

⁸ The idea of money as a store of value was not unknown before the years of high theory. Menger, for instance, came to this notion first by focusing on the uncertainty resulting from our will to exchange, in conditions of division of labour, the goods that we offer for the goods offered by others but unknown to us in number, quality and exchangeability until we face them in the marketplace: hence the need for, and the rise of, money as the "ultra-liquid" good for which every other good is easily exchanged (1900 [1936], p.258ff). But he also focused on money as a device by which men can hedge against unforeseeable events and compensate for possible errors. It should be noted that the former kind of uncertainty relates to our ignorance of *what is already there* while the latter refers to our ignorance of *what is not there yet*. Shackle's theory of money is concerned with the latter kind of uncertainty and is consistent only in this sense with the idea that "one must introduce uncertainty before one can introduce money" (Hicks, 1982, p.7).

⁹ Once this idea of money was brought to the front stage of economic analysis, it was inevitable to adjust the whole theory of production accordingly. This adjustment was achieved by Keynes through his "monetary theory of production" which deals with a *monetary* (or *entrepreneur*) economy as distinct from a *real-exchange* (or *neutral*) economy (CW, XIII, pp.381ff and especially pp.408-11).

Hence the question that lies at the roots of Keynes's rejection of Say's Law: in a system without money or, to be more precise, in a system where money is considered only as "a device running at its own speed", does not Say's Law hold true? Shackle's answer runs as follows:

"The answer which seems to me to impose itself is that money ["in its full nature", 1967, p.93 and below §3] absolves those who seek to accumulate wealth out of current production from necessarily themselves deciding what real form this wealth should take, placing the burden of this decision, and its consequences, on a few business men. It thus greatly multiplies, and offers extensive leverage to, the basic fact of ignorance of the future, and enables what might, in a barter system, be a large number of mostly unimportant discrepancies between the supply and demand of individual goods and the exertions and reward of individual persons to become a unified, measurable and very large gulf between what has been deemed worth producing in hope, and what, when market day comes at the end of a long period of speculative commitment of resources, actually proves to be exchangeable for money. Money enormously enlarges the hurtful power of uncertainty at the same time as it enormously facilitates the beneficent power of specialization" (1967, p.136-7)¹⁰.

3. *Ex ante* vs. *ex post*

The fact that individuals may hold at the same moment divergent or even opposite expectations of some future event should be distinguished from the fact that the expectations held by all the individuals who take similar decisions at the same moment (aggregate expectations) may be contradicted by the events that will emerge in the course of (historical) time after this moment is past. While the former fact mostly relates to the future behaviour of *prices* of particular goods or assets, the latter fact rather refers to the behaviour of macroeconomic *flows* such as output, consumption, saving and investment in the forthcoming period. Hence the importance of expectations for period analysis and the associated concept of macroeconomic equilibrium (which is an equilibrium *in time*). Hence the introduction of two new notions, i.e. first, the notion of the amounts that, at the threshold of the period, are *intended* (by entrepreneurs and income-receivers) to be formed during the period; and second, the notion of the amounts that, at the final date of the period, *have been* formed during the same period. Myrdal (1939) highlighted this difference by introducing the terms *ex ante* for the macro-variables considered in the first sense and *ex post* for the (same) macro-variables

¹⁰ The validity and limits of Say's Law are also defended as follows: "Inequality of total demand and total supply, to be logically possible, requires the presence and the play of both *ignorance* and *money*. Ignorance, in the real world, there is indeed: ignorance of the future. And money is that institution which permits *deferment* of specialized, fully detailed choice" (1967, p.91). Hence the possibility of *speculation* as the "exploitation of ignorance" and the *rationale* of the interest rate as the price paid for compensating the uncertainty associated with lending money, i.e. for "parting with a known sum in exchange for an unknown sum" of money (1972, pp.12-3). See, however, below §5.

considered in the second sense. Shackle (1965, Chapter IV; 1967, Chapters 9-10; 1972, Chapter 37) most ably shows not only why this distinction is necessary in period analysis but also how it can be used to identify some flaws, and to fill some voids, in Keynes's theory.

Shackle's account of the former aspect is also an attempt to justify the title of Myrdal's 1939 book:

"In a model where money in its full nature (not merely in its role of unit of account) plays an essential role, the equality of total demand and total supply is a condition or special circumstance which is logically capable of non-fulfilment. The monetary theory which Wicksell evolved from suggestions of Ricardo, and which Lindahl clarified and to which Myrdal gave the vital spark by his distinction of the two temporal viewpoints *ex ante* and *ex post*, and to which he gave a brilliant elegance and logical rigour, was devised with the very purpose of analysing the *conditions* of equality of total monetary demand and supply of the general output of goods of all sorts. It has also, of course, the purpose of studying the implications of non-fulfilment of these conditions" (1967, p.93).

The fulfilment or non-fulfilment of these conditions are most likely to occur when it comes to the crucial relation between *aggregate* saving and *aggregate* investment. The link between this relation and the relation between aggregate demand and aggregate supply consists, to begin with, in the fact that both relations can be viewed either as *accounting identities* or as *equilibrium conditions* according to the following six relations (of which four are identities and two are equilibrium conditions) (1967, p.95):

- (i) Expected income is *identically equal* to value of intended production.
- (ii) Expected income is *identically equal* to intended consumption-spending plus intended saving.
- (iii) Value of intended production is *identically equal* to intended consumption-spending plus intended saving.
- (iv) Intended demand is *identically equal* to intended consumption-spending plus intended net investment.
- (v) Intended demand *can be equal* to value of intended production.
- (vi) Intended net investment *can be equal* to intended saving.

Taken together, these relations indicate that intended demand (iv) *may not* be equal to value of intended production (iii) *because* intended net investment (vi) *may not* be equal to intended saving (vi), it being understood that any such inequality is usually brought about not by changes in intended saving but by the changes in intended net investment. These changes will result from shifts in the expectations concerning the "yield of planned investments" (in Myrdal's terms), the "marginal efficiency of capital" (in Keynes's terms) or the "rate of return

over cost” (in Fisher’s terms)¹¹. When (vi) does not involve equality, the economy faces a *macroeconomic disequilibrium*: this outcome is as inescapable in an economy *in time* as much as its opposite is inescapable in the abstract economy of GET.

Shackle’s discussion of the *ex ante/ex post* distinction, however, is extended to show that some of the “many things” to be found in Keynes’s thought are muddled by his failures to make use of this distinction. At the core of these failures is, according to this view, Keynes’s inability to use the concept of income as a forward-looking variable rather than, as implied by Keynes and many Keynesians, as the more familiar backward-looking notion concerning what has been earned in a given period. Hence Keynes’s vacillations between a *process* conception of the Multiplier -involving expectation and decisions- and the *instantaneous* conception by which consumption depends on *realized* income (in which case, Shackle argues, the mechanism would not work) rather than on *expected* income (in which case, Shackle argues, an increase in expected consumption should rather be understood as an increase in *orders* for supplies). Keynes’s neglect of the *ex ante/ex post* distinction, however, is particularly dangerous when he comes to the relation between *aggregate* saving and *aggregate* investment. Here his vacillations serve to conceal, rather than to highlight, the reason for their possible discrepancies. Thus, referring to chapter 7 of the *General Theory* where saving and investment are claimed to be necessarily and identically equal, Shackle argues:

“The reader of that chapter will perceive that its reasoning refers to *ex post* quantities, and taking it by itself we therefore find it perfectly acceptable. But it leaves Keynes’s general position quite ambiguous. Does he believe that by proving this identity he is saying something about a coherence of intentions or wishes? If not, what is the mechanism by which a possible (and exceedingly likely) disagreement between total intended saving and total intended investment is corrected into an *ex post* equality?” (1967, p.148).

Following Hawtrey’s insight on Keynes’s ambiguity on this issue¹², Shackle argues that “it is the level of incomes which *moves in search* of an equilibrium between (designed, *ex ante*) saving and (designed, *ex ante*) investment” and that “when there is a disparity, a disequilibrium, between the two *ex ante* quantities, there will almost inevitably follow one period later, that is, so soon as this disparity is revealed *ex post*, a set of decisions by business men to change designed general output, and thus aggregate income” until the designed saving and investment of the *next* period are brought, if ever, to equality” (1967, pp.242-3). Thus

¹¹ “The fulfilment of this condition is that state of intentions which constitutes *monetary equilibrium*, and this equilibrium, which might be more illuminatingly called equilibrium of general output and general demand, is nonetheless justifiably linked with the notion of money because only the presence of money in the full sense makes possible any divorce, *in the aggregate*, between production intentions and demand intentions” (*ibid.*, p.95-6).

¹² “If saving and investment are defined as ‘different aspects of the same thing’ how can it possibly be ‘the level of income which ensures equality between saving and investment’?” (Hawtrey, 1937, p.437).

Keynes's ambiguity is said to descend from his tendency to telescope the *moment of decisions* and the moment of *confrontation of the acts implied by decisions* (i.e. the two ends of the Myrdallian interval, the *ex ante* and the *ex post*):

“His constant reiteration that investment and saving cannot be unequal, but are brought to equality by changes of income, means that he defines income, not as the value-added which the business men imagine and look to when they sign contracts of factor employment relating to the coming interval, but as the value-added which they *would* assign to their production plans were they able, in some Wellsian time-machine, to move forward to the end of that interval and see what quantities, at what prices, will actually be sold, and then move back again to its beginning to note that when correct valuations are placed upon their production plans, saving and investment are equal” (1967, p.238).

This insight implies that Keynes's period analysis lacks a suitable *equilibrium mechanism* for supporting his *equilibrium method*¹³.

4. Theory of interest vs. theory of (money) interest rate(s)

The crucial role assigned to money as a store of value in the EUE Paradigm could not be without consequences for the theory of *interest*. Shackle's views on interest are pursued at length both in the *Years of High Theory* and in *Epistemics and Economics*. They stem from Keynes's view of interest as the “reward of not-hoarding” rather than as the “reward of not-spending” (1936, ch.13) and must be regarded as an application of the more general theory of uncertainty and expectations. As is well known, Keynes's view of interest is put forward in his *liquidity-preference* theory (1936, Chapters 13-17). This theory must be distinguished from what may be called, following the title of Cassel's celebrated book, the *nature-and-necessity* theory of interest, the founding father of which is, as is also well known, Böhm-Bawerk. Keynes's and Böhm-Bawerk's theories of interest fall apart in two senses. First, because the object of Böhm-Bawerk's theory is the nature of interest *sub specie aeternitatis*, i.e. regardless

¹³ The importance of the *ex ante/ex post* distinction is missed in most macroeconomic textbooks and literature. Blanchard (2000), for instance, underrates the role of this distinction and emphasizes Keynes's “methodological contributions” to such an extent that he claims (*contra*, but without mentioning, Shackle's interpretations) that “throughout the 1920's and 1930's the focus was increasingly on the role of the equality of saving and investment, but the semantic squabbles that dominated much of the debate (the distinction between ‘*ex ante*’ and ‘*ex post*’, ‘*planned*’ and ‘*realised*’ saving and investment, the discussion of whether the equality of saving and investment was an identity or an equilibrium condition) reflected a deeper confusion. It was just not clear how shifts in saving and investment affected output” (pp.1378-9, where it is pointed out that this was made clear only in the *General Theory*). The implicit treatment or mistreatment and the eventual rejection of the *ex ante/ex post* distinction in Keynes's theory deserves a proper study. For a starting point, see Kregel (1976) and Shackle himself (1965, Chapter IV; 1967, Chapters 9-10; 1972, Chapters 16 17, and pp.439-42). See also above footnote 7 and below footnote 17. For the argument that Keynes's ambiguity on this issue was a matter of *method* rather than of *words*, see Shackle again (1967, pp.142-3; 1965, Chapter IV). On the links between *desidered/undesired* stocks, *flexprice/fixprice* models and *stock/flow* equilibrium, see in this connection Hicks (1974, Section II). The relevance of the *ex ante/ex post* distinction in modern macroeconomics is implied by the difference between the analytical concept of *period* and the historical concept of *run* highlighted by Harcourt (2006, p.62, n.6).

of whether interest is studied in the context of a money or a barter, a primitive or an advanced economy; and more generally regardless of whether the institutional setting of this economy is of one sort or of another. Second, because, whatever the economy and whatever its institutions, interest is studied by Böhm-Bawerk regardless of the factors that determine its *size* (the interest rate) and particularly the changes of this size from period to period¹⁴. Shackle's account of the theory of interest, however, is such that he seems to regard Keynes's and Böhm-Bawerk's theories as if they were both centred on the same phenomenon, i.e. on interest as such. But it should be noted that it is Böhm-Bawerk's theory that is centred on interest as such while Keynes's theory is rather concerned with the *rate of interest* and, more precisely, with the *money* rate of interest. Thus, while writing the story of this theory, Shackle exposes himself to the same risk faced while discussing the rise of the EUE Paradigm and the replacement of GET. This risk consists in believing that Keynes's new theory replaces the old not only in the *relative* sense argued above but also in the *absolute* sense of falsifying the old theory. This risk is conveyed by Shackle's (and Keynes's) tendency to use the term "interest" interchangeably with the term "interest rate" and to deal with the latter as if there were no difference between the "interest rate" as such and the "money rate of interest". Shackle claims, for instance, that "interest exists and is positive, because of the lender's inescapable uncertainty. Its rate is determined in the bond market" (1967, p.203); and he points out elsewhere that "in a modern Western economy interest is mainly a manifestation, not of impatience nor of the higher technical productivity of roundabout methods, but of uncertainty" (1968, p.VIII). These views imply a refutation of Böhm-Bawerk's theory of interest and, particularly, of its "three causes" - which hold under perfect foresight- to the benefit of the overall cause of uncertainty in an historic and institutional context¹⁵. Thus Shackle's eventual admission that "the Austrian theory is not futile and unilluminating" (1972, Chapter 29, p.331) should be intended to apply to the Austrian theory of *capital* rather than to the Austrian theory of *interest*¹⁶.

¹⁴ The distinction between interest as such and the rate of interest was raised by Böhm-Bawerk against Fisher's alleged confusion between the *originating* causes of interest and the *determining* causes of its rate (1889 [1959, Vol. III, *Further Essay XII*, p.183ff]). See also Hayek (1941, Chapter XXVI).

¹⁵ While admitting that an income must be earned by the owners of the capital stock owing to their decisions to finance its creation in the past, Shackle continues: "Böhm-Bawerk called such income 'interest', but, as we have pointed out, he was not concerned with the idea of money in the full sense, and built a model which has no place for it. Thus the income which he called 'interest' would in Marshallian terms be called 'quasi-rent'" (1965, p.160). But this implies a confusion between "interest" and "quasi-rent"; a confusion that is coherent, it should be added, with the confusion between "interest" and "money interest" discussed above.

¹⁶ The idea that the theory of interest has been thoroughly re-written –rather than enlarged- by Keynes is implicitly denied in an initial passage of Keynes's own exposition of this theory when he argues that "the mistake in the accepted theories of the rate of interest lies in their attempting to derive the rate of interest from the first of these two constituents of psychological time-preference [i.e. the propensity to save and the liquidity preference] to the *neglect* of the second; and it is this *neglect* which we must endeavour to repair" (1936, p.166; italics added). As an

Apart from these misunderstandings, Shackle's account of what determines the rate of interest in a monetary economy is quite clear. The equilibrium money rate of interest is determined in the bond market (where bonds are exchanged for money and money for bonds). This rate brings about the equilibration of two *flows* and two *stocks*; i.e. the flows of *net lending* (the underwriting of bonds) and of *net borrowing* (the issuing of the same bonds), on the one hand, and the stocks of the bonds existing at a particular moment and of the bonds *wanted by potential holders* at this very moment, on the other. Thus the "enigma and dilemma" of interest-rate theory consists in determining how this twofold equilibration is reached. Indeed, while the flow mechanism calls for actual transactions between issuers and underwriters of bonds, the stock mechanism need not: here a change in expectations is enough to force the prices of existing bonds up or down and, accordingly, the interest rate down or up. Since, however, the quantity of old bonds in existence is in a modern economy overwhelmingly greater than the quantity of annual bond issues, uncertainty and expectations are more relevant in determining today's interest-rate than any change in the relative strength of today's lending (saving) and borrowing (investment). Finally, the link between changes in the stock equilibrium of the bond market and changes in the level of employment is brought out by Shackle as follows:

"Suppose that the 'stock' mechanism, being dominant, has carried the rate of interest above the level which would have resulted from the 'flow' mechanism operating alone, and that at this high level the society's desired saving flow exceeds its desired net investment flow. Since, *ex post*, these flows must by logical necessity be equal, we have to explain how it comes about that one or other or both of the realized flows differs from its corresponding intended flow. The first result of disparity may be that some goods, intended for immediate sale to consumers, will be left with their producers and constitute unintended investment. Later it seems likely, or inevitable, that production as a whole will be reduced. Out of the smaller income which measures this lower production, the society will desire to save less than it had formerly hoped to out of its former relatively large income. Too high an interest rate will have caused unemployment and a reduced general output, If the 'flow' mechanism is prevented (by the dominant 'stock' mechanism) from performing its task at a high level of general output and aggregate incomes it will compel the reduction of that output and income to a level where it can perform its task. Keynes's theory of employment *requires* the supposition that the 'stock' mechanism is, or at least can be, dominant" (1967, p.208).

indication of Keynes's ambiguities and an implicit clue to the accusation that he eventually had "a college bursar's theory of interest", see his remarks on Marshall as someone whom he regards as responsible for what we can in turn regard as a *reciprocal* misunderstanding: "The perplexity which I find in Marshall's account of the matter is fundamentally due, I think, to the incursion of the concept 'interest', *which belongs to a monetary economy*, into a treatise which takes no account of money. 'Interest' has really no business to turn up at all in Marshall's *Principles of Economics* –it belongs to another branch of the subject" (1936, p.189; italics added).

This passage shows that the notion of money as a store of value, if properly combined with the notions of stock equilibrium in the bond market and of flow equilibrium in the saving-and-investment markets, paves the way for connecting Keynes's theory of the money rate of interest with his own theory of involuntary unemployment, on the one hand, and with Myrdal's ex ante/ex post distinction, on the other.

However brilliant and insightful, Shackle's coordination of these streams of thought and of the evolution of Keynes's liquidity-preference theory before and after 1936 (i.e. from what he calls the 1930 'first edition' of Keynes's theory in his *Treatise on Money* to the 1936 'second edition' of the *General Theory* to the 1937 'third edition' of the *Quarterly Journal of Economics* article to the never written 'fourth edition')¹⁷ does not go so far as to coordinate or contrast them, along with the debate on interest that took place in the 1937 issues of the *Economic Journal*¹⁸, with the contributions or extensions provided by two eminent scholars such as Hayek, on the one hand, and Hicks, on the other.

Concerning Hayek, it should be noted that the problem of what determines, in a monetary economy, the *price* of "something to keep" versus the price of "something to sell, buy and use now or never" (Shackle, 1965, p.91) bears some resemblance to the problem (as set out, for instance, in *Prices and Production*) of what determines, in a real economy, the amounts and shapes of the capital goods existing at an *instant* of time (a stock equilibrium or disequilibrium in real terms) versus the amounts and shapes of the capital goods that are produced in a *period* of time (a flow equilibrium or disequilibrium in the same terms). And it should equally be added that the ex ante/ex post distinction may be used to address both problems though the role it plays in addressing the latter is more significant than in the former. Any discrepancy between ex ante saving and investment, for instance, may result in a change in the price of securities (and therefore in the money rate of interest) if it is related to the former problem. But it may also result in a change in the shapes of the capital goods produced (and more generally in the structure of production) if it is related to the latter. In the passage above, Shackle's argument is focused on the former rather than on the latter problem. This is a strictly Keynesian argument and should be distinguished from Hayek's structure-of-production argument which is focused instead on (inappropriate) changes in the production of capital

¹⁷ Shackle traces the never written "fourth edition" of Keynes's liquidity-preference theory to Keynes's promise to deal in "a future article which I intend to write" with "the relation of the 'ex ante' and 'ex post' analysis in its entirety to the analysis in my *General Theory*" (1967, p.227).

¹⁸ The debate was launched by Ohlin in the March issue and continued until the publication of Keynes's concluding article in the December issue. The rise of the debate may be traced to Keynes's (and partly to Ohlin's) inability to understand that "Myrdal had not invented a new analysis, he had pointed out the true nature of the existing one" (Shackle, 1967, p.228).

goods resulting from an increase in the stock of money (forced saving) rather than from an increase in aggregate demand resulting from an initial change in aggregate investment (whether due to a shift in the marginal efficiency of capital or in the money rate of interest)¹⁹.

Concerning Hicks, Shackle does indeed ascribe to this author the merit of identifying the “starting-point” of the “theory of interest” (more properly: of the money rate of interest) with the Keynesian question about what makes people willing to hold some of their wealth in barren money rather than in interest- or profit-yielding assets (1967, pp.226-7). Yet he fails to take into account Hicks’ own elaborations on this “starting point” in *Value and Capital* (1939). The structure of this book epitomizes the great change that took place in economic theory during the 1930’s, i.e. the transition from the static method of GET (Part I and Part II) to the dynamic method that underlines the theory of expectations and fluctuations (Part III and IV). Thus Hicks’s own analytical constructs (such as the ‘week’, temporary and intertemporal equilibrium, elasticity of expectations, plans and their coordination, spot and forward interest rates)- are not examined by Shackle in conjunction with the other “inventions” of those years. It is ironic to note that he could have found in Hicks’s work a development both of the positive and of the negative aspects of Keynes’s theory²⁰. This development should be located in chapters IX-X and XI-XIII of *Value and Capital* if only because the latter group of chapters deal with the theory of *money rates* of interest, chapter XI being wrongly titled –à la Shackle- “Interest” rather than –as would be more appropriate- “The Term Structure of Interest Rates”).

5. Capital and Time

A place where Shackle comes closest to the notions of logical and historical time is when he deals with the “paradoxical contrast” between the timeless system and the long period conception (both of which “treat time with disdain” although the former excludes it altogether through the pre-reconciliation of choices while the latter introduces it into the picture but only

¹⁹ On the impact of discrepancies between (voluntary) saving and investment on the shapes of capital goods, see Lachmann’s treatment of changes in his “capital structure” resulting from changes in expectations (1978). It should also be noted that, when he comes to an explicit treatment of (time in) the theory of capital (more on this below in section 5), Shackle shifts his focus from the Keynesian (financial-market) approach to the money rate of interest towards a remake of Bohm-Bawerk’s old and static theory of capital (not, in any case, towards a remake of the latter’s theory of interest as such) rather than of Hayek’s dynamic version of the old theory. See, however, Shackle’s own and brief treatment of the composition and direction of what he calls the “capital complex” (another expression for Lachmann’s capital structure) in his 1972 book, Chapter 29, §29.2 and §29.11.

²⁰ It is interesting to note that Hicks himself came up to this task later when he admitted that his 1939 book had built “a kind of a bridge, but, as I now see very well, it was a very imperfect bridge, not so very unlike the imperfect bridge that had been built by Keynes. My theory also was divided; there was a part that was *in* time and a part that was not. But we did not divide in the same place” (1976, p.141).

through the oscillations consequent on an initial shock) (1967, p.127); and later on when, in Book IV, *The rejection of time*, and Book V, *Diachronism: the artefact of time*, of *Epistemics and Economics*, it becomes clear that it is historical (not logical) time that is rejected by the GET Paradigm whereas it is logical (not historical) time that is the artefact of “diachronism”, the method adopted in Böhm-Bawerk’s theory of capital.

Diachronism is a method for dealing with logical time when time is not considered as confined to the *present* or *solitary* moment (in which all the pre-reconciled choices of GET are made) but is rather extended to the *succession of moments* into which the unlimited calendar-axis can be divided. Time in this sense is a sort of *space with succession* and should be distinguished from a *sequence of periods*, the kernel of process analysis, where changes in knowledge, expectations and errors are more properly involved. Time intended in the first sense is what underlies the economics *of* time while time intended in the second sense is what underlies the economics *in* time. But, when he comes to the role assigned to the passage of time in the Austrian theory, Shackle fails to coordinate the analysis of time as an *ingredient* (in modifying intertemporal values or the volume of output, as for instance in Böhm-Bawerk’s theory) and the analysis of time as a *container* of events (Meacci, 1994)²¹. Hence Shackle’s ambiguities on the “powers and limitations” (1972, p.306) of the Austrian (Böhm-Bawerk’s) theory. For, on the one hand, he notes that “capital requires, and rewards, deferment of the fruits of effort” (*ibid.*, p.304) (this is indeed the foundation of that Austrian theory of interest that Shackle fails, as we argued above, to keep apart from the Keynesian theory of the money rate of interest) and that “the more nearly the economic society is confined to a hand-to-mouth existence, the more nearly, in principle, can its operations approach the rational” (*ibid.*, p.157)²²; while, on the other hand, he parts company with Böhm-Bawerk when he starts with a definition of capital *à la* Fisher as a set of capital-values and with a definition of income *à la* Lindahl as an appreciation of these capital-values (*ibid.*, pp.66-7). He eventually supports Lindahl’s definition if only because this belongs to the context of historical time and concludes that the theory of capital built on this notion “goes to the heart of things” whereas Böhm-Bawerk’s theory is based on the assumption of the stationary state where knowledge and

²¹ On this ambiguity, see Shackle’s notions of “time as room for something”, “time inseparable from tool using” and “time as the field of expectation”, in Shackle, 1972, pp.284-5, pp.268-9 and p.266. On Shackle’s account of how Marshall faced this ambiguity, see *ibid.*, p.289ff.

²² “For when the goods dealt in on the markets are perishable and ephemeral, they must be changed at once and therefore find a price at once, and there will be no considerations bearing on that price except the immediate needs, tastes and momentary endowments of the members of a society. Prices in such a society *must* be formed; they *can* be formed because they are properly based on definite and simple data. It is the introduction of ‘wealth’, of assets which promise and represent permanence or persistence, that must destroy the basis of rationality” (1967, p.157). On the role of (short-term) expectations in “processes which occupy time”, see Keynes (1936, p.46).

foresight are assumed to be perfect, events can be “both sequential and co-existent” and processes of change are excluded (*ibid.* pp-316-7; 329-331).

Yet it remains to be seen whether the theory that “goes to the heart of things” should be the *expectational* theory of capital advocated by Shackle or, rather, Böhm-Bawerk’s *diachronic* theory. It can indeed be argued that Shackle’s view of the “heart of things” might as well be reversed to the benefit of the old Austrian approach. For diachronic and expectational theories are to each other as men’s capacity to *stand* is to their capacity to *walk* or *run*: as it belongs to the natural course of things that we should first learn to stand and then to walk or run, likewise the Austrian theory of capital should be expected to come first while it is an idle question to wonder whether this theory is inferior to the theory that came later. Shackle’s difficulty in recognizing what was to come first and what was to come later in the history of capital theory (let alone of economic theory at large) proves by itself the validity of Marshall’s statement that “the element of time is the centre of the chief difficulty of almost every economic problem” as well as the vain boldness of Marshall’s “relentless effort to bring into one fabric of argument the two incompatibles” (i.e. the different problems relating to logical and historical time) (Shackle, 1972, p.286).

It should be recalled, however, that the Austrian theory comes in two instalments and that the second instalment, which was designed to overcome the limits of the first, is due mostly to Mises and Hayek. Hayek, in particular, was the one who took the static core of the theory of capital out of the stationary state and placed it into the context of historical time (to which fluctuations belong). Hence the coalescence of the (Austrian) theory of capital into “the great macro-economic river” where it “became enmeshed with the theory of money” and contributed to forming the new theory of business cycles (Shackle,1981). The second instalment is best understood if one starts from Shackle’s division of theories into *Theories of Natural Success* (GET Paradigm) and *Theories of Capability of Error* (EUE Paradigm) (1972, Chapter 30). This instalment belongs to the latter group of theories in spite of Hayek’s 1928 article on intertemporal equilibrium and the resulting neglect of expectations in Hayek’s early work on fluctuations. For, concerning intertemporal equilibrium, it can be argued that it is this equilibrium that is upset by fluctuations (so that the latter are best understood if one starts from an economy where they cannot occur) and, concerning expectations, it can equally be argued that their disappointment is what is dealt with *implicitly* in Hayek’s 1931 book (and explicitly in later publications). Although in the *Years of High Theory* Shackle does not reserve to Hayek’s contributions the detailed attention reserved to Keynes’s, in his 1981 article he pays due tribute to Hayek’s insights on the *ex ante/ex post* discrepancies and on the

coordination/miscoordination of plans in “competitive” -as distinct from “simple”- economies when time is an essential *ingredient* of production (Hayek, 1941, Chapter II, Part II and Part III)²³.

6. Concluding Remarks

What Shackle writes of Hayek (“clear and incisive in thought; the embodied principle itself of following the logic where it leads: the soul of scholarly generosity”: 1981, p.234) may apply to Shackle himself. Indeed, the attribute of “scholarly generosity” fits Shackle more properly than Hayek. What cannot apply to Shackle is his praise of Hayek as “one of the outstanding sculptors of this age’s thought”. But it remains to be seen whether this is Shackle’s fault. The mainstream of “this age’s thought” has indeed turned most of its back to Shackle’s own sculpture. This can be noticed in a number of fields for a number of reasons. One of these is Shackle’s generosity towards *both* Keynes *and* Hayek for, as Shackle admits, he “received the ‘sealed orders’ of his career” in the former’s *Treatise on Money* and in the latter’s *Prices and Production* (Shackle, 1983, p.108) (but it was implied above that the former’s ‘sealed orders’ are stronger than the latter’s). Another was the rise of “hydraulic” or “bastard Keynesianism” and the “Keynesian” policies pursued by most governments in its wake. Still another was the direction taken by the theory of expectations in the last decades of the 20th century with its emphasis on rationality and equilibrium even in economies immersed in historical time. Finally, and perhaps more important than anything else, was the rise in the second half of the 20th century of an approach by which the GET Paradigm –either in its old or in its newly forged versions- came to be regarded as “a kind of umbrella general enough as to be able to cover *all* economic theories, including also Keynes’s” (Pasinetti, 2005, p.211, n.3). This tendency, it must be noted, should in turn be distinguished from, and –due to its own misunderstandings of the different scopes of different paradigms- should rather be regarded as worse than, the idea of an “absolute” replacement of the GET by the EUE Paradigm occasionally implied (and occasionally denied) in Shackle’s works.

²³ Though entirely devoted to Hayek’s contributions, Shackle’s 1981 article fails to bring out the continuity lying behind their convoluted developments between the 1928 article on intertemporal equilibrium (which can be regarded as a situation where expectations are always fulfilled) and the publications of the following decade (which deal instead with situations in which this fulfilment does not occur). This continuity is implicitly defended in *The Pure Theory of Capital* (where, for instance, it is argued that “the statement of the conditions under which individual plans will be compatible is implicitly a statement of what will happen if they are not compatible”, p.23) and has been recognized by Graziani (1996). It should finally be noted that in his 1981 article, Shackle also fails to bring out the common interest shared by both Hayek and Keynes, his two conflicting mentors, for the role of expectations. On expectations as an “opportunity” missed by the Austrians, see however Lachmann (1976).

Not that Shackle's thought is without contradictions. We have warned above against some of the arguments, and especially some of the words, by which Shackle's view of the history of economic theory in the 20th century is put forward. We have first highlighted his ambiguous treatment of the replacement of the GET Paradigm by the EUE Paradigm and we have rejected his view of Keynes's theory of the *money rate of interest* as an "absolute" substitute for Böhm-Bawerk's theory of *interest*. But the sharpness and elegance by which Shackle goes to the heart of the EUE Paradigm and of Keynes's "monetary theory of production" are such as to provide the reader with the key for grasping on his/her own not only the huge *differences* but also the distant *compatibilities* between the two Paradigms. Both these differences and compatibilities descend, it was argued above, from the two different foundations -*logical* (or no) time in one case, *historical* time in the other- on which the two Paradigms stand.

REFERENCES

- Blanchard O. (2000), "What do we know about macroeconomics that Fisher and Wicksell did not?", *Quarterly Journal of Economics*, pp.1375-1409
- Ford J.L. (1993), "G. L. S. Shackle (1903-1992): A Life with Uncertainty", *The Economic Journal*, 103, pp.683-697
- Fossati E. (1957), *The Theory of General Static Equilibrium*, edited by G.L.S.Shackle, Oxford: Blackwell
- Graziani A. (1996), "L'equilibrio fra risparmi e investimenti secondo Keynes e Hayek", *Rivista Italiana degli Economisti*, 3, pp.325-365
- Harcourt G.C. (2006), *The Structure of Post-Keynesian Economics*, Cambridge: Cambridge University Press
- Harris D.J. (2005), "Robinson on 'History versus Equilibrium'", in Gibson B. (ed.), *Joan Robinson's Economics. A centennial Celebration*, Cheltenham: Edward Elgar
- Hawtrey R.G. (1937), *Capital and Employment*, London: Longmans & Green
- Hayek, F. (1941), *The Pure Theory of Capital*, London: Macmillan
- Hicks J. (1939), *Value and Capital*, Oxford: Clarendon Press
- Hicks J.R. (1974), *The Crisis in Keynesian Economics*, Oxford: Basil Blackwell
- Hicks J.R. (1976), "Time in Economics", in Hicks J.R. (1982, pp.282-300)
- Hicks J.R. (1980), "IS-LM: An explanation", in Hicks J.R. (1982, pp.318-31)
- Hicks J.R. (1982), *Collected Essays on Economic Theory*, Vol. II, Oxford: Blackwell
- Keynes J.M. (1921), *A Treatise on Probability*, in Keynes J. M. (1973, Vol. VIII)
- Keynes J.M. (1937), "The General Theory of Employment", *Quarterly Journal of Economics*, XIV, pp.109-123

- Keynes, J.M. (1973), *The Collected Writings of John Maynard Keynes*, Cambridge: Cambridge University Press, 27 vols
- Knight F. (1921 [1971]), *Risk, Uncertainty and Profit*, Boston: Houghton Mifflin [Chicago: Chicago University Press]
- Kregel J.A. (1976), “Economic Methodology in the Face of Uncertainty: The Modelling Methods of Keynes and the Post-Keyensians”, *The Economic Journal*, 86, 209-25
- Lachmann L. (1959), “Professor Shackle on the economic significance of time”, *Metroeconomica*, 11, 64-73
- Lachmann L. (1976), “From Mises to Shackle: An Essay on Austrian Economics and the Kaleidic Society”, *Journal of Economic Literature*, 14, 54-62
- Lachmann L. (1978), *Capital and its Structure*, Kansas City: Sheed & McMeel
- Lachmann L. (1990), “G.L.S. Shackle's place in the history of subjectivist thought”, in Frowen S.F. (ed.), *Unknowledge and choice in economics: Proceedings of a conference in honour of G. L. S. Shackle*, New York: St. Martin's Press; 1-8
- Meacci F. (1994), “Hayek and the deepening of capital”, in Colonna M., Hagemann H., Hamouda O. (eds), *Capitalism, Socialism and Knowledge*, 1994, Volume II, pp. 26-44
- Menger K. (1900 [1936]), “Geld”, in *The Collected Writings of C. Menger*, Vol. IV, London School of Economics
- Myrdal G. (1939), *Monetary Equilibrium*, London: Hodge (Swedish ed., 1931; German ed., 1933)
- Pasinetti L.L. (2005), “How much of John Maynard Keynes can we find in Franco Modigliani?”, *Rivista Italiana degli Economisti*, X, pp.205-221
- Robinson J. (1962), *Essays in the Theory of Economic Growth*, London: Macmillan
- Robinson J. (1974), “History versus Equilibrium”, *Thames Papers in Political Economy*, London: Thames Polytechnic, reprinted in CEP, vol.V, 1979, pp.48-58
- Robinson J. (1951-1980), *Collected Economic Papers*, 6 vols, Oxford: Basil Blackwell
- Shackle G.L.S. (1956), “Marshallian and Paretian Systems”, in *Metroeconomica*, pp.159-62 (also in Fossati, 1957, Foreword)
- Shackle G.L.S. (1958), *Time in Economics*, Amsterdam: North-Holland
- Shackle G.L.S. (1965). *A Scheme of Economic Theory*, Cambridge: Cambridge University Press
- Shackle G.L.S. (1967), *The Years of High Theory: Invention and Tradition in Economic Thought, 1926-1939*, Cambridge: Cambridge University Press
- Shackle G.L.S. (1968), *Uncertainty in Economics and other Reflections*, Cambridge: Cambridge University Press
- Shackle G.L.S. (1969), *Decision, Order and Time in Human Affairs*, Cambridge: Cambridge University Press
- Shackle G.L.S. (1972), *Epistemics and Economics: a Critique of Economic Doctrines*, Cambridge: Cambridge University Press
- Shackle G.L.S. (1979), *Imagination and the Nature of Choice*, Edinburgh, Edinburgh University Press

Shackle G.L.S. (1981), "F.A.Hayek, 1899-", in O'Brien D.P. and J.R.Presley (eds), *Pioneers of Modern Economics in Britain*, London: Macmillan, 1981, pp.234-261

Shackle G.L.S. (1983), "A Student's Pilgrimage", *Banca Nazionale del Lavoro Quarterly Review*, 104, pp.108-16

Vickers D. (1994), *Economics and the Antagonism of Time: time, uncertainty, and choice in economic theory*, Ann Arbor: University of Michigan Press